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YOUR MIND AND MINE

YOUR MIND AND MINE

AN ACCOUNT OF PSYCHOLOGY FOR
THE INQUIRING LAYMAN AND THE
PROSPECTIVE STUDENT

Ed
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BY

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WITH MANY ILLUSTRATIONS
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Ed / 111

TO

MY WIFE, MONICA

WHOSE ASSISTANCE WITH MORE VITAL
MATTERS OF RESEARCH HAS MADE
POSSIBLE THIS EXCURSION

33
111

GOVT. TRAINING
HOOGHLY
SCHOOL

PREFACE

Much lip-service is paid in educational circles to the sound adage that the first aim in teaching must be to arouse the student's interest. Yet the university lecturer who propounds the theory frequently forgets what lowly beginnings this interest has, and even when he remembers he is unwilling to pay the price of interest by sacrificing the academic rigidity and finish of his presentation. At the risk of being labelled a vulgar popularizer I have considered the student primarily as a human being with broad and not too disciplined interests, by gathering up which I can hope to lead him eventually into the heart of the subject.

Yet it would be a bold writer who would venture to say for what kind of public his exposition is suited. *Gulliver's Travels*, intended for adults, became the story-book of children. *Alice in Wonderland*, *Peter Pan*, and many interesting journals, written for children, find their way, like Christmas toys, mysteriously into the hands of adults. In psychology, McDougall's *Social Psychology*, written as a popular account for the layman, has become an official text-book, to the consternation of some professors and the delight of all students. In the light of these warnings I state my intention, for what it is worth, of planning the present exposition to provide a survey for the inquiring layman and a general introduction for the first-year student, whether in education or psychology.

Of a dozen contemporary popular psychologies which lie before me, most would, I think, be judged impartially as failures, either because they fail to view the subject as an organic, living growth, or, more commonly, because they lead to no real grasp of the science.

It is significant that one of the exceptions was the brilliant work of a botanist, an outsider, viewing psychology from without. For a rapidly advancing science is necessarily in some confusion, like a house undergoing a perpetual spring cleaning, and the inhabitants may be excused a little hesitation in deciding which is the proper showroom for visitors. Some lead the newcomer back to philosophical psychology, the library and the dust-laden statues of Plato and Aristotle. Others usher visitors into the laboratory, which at the moment looks forbiddingly technical and detached from real life. Those with the largest following of sightseers, repelled by the dusty and sterile platitudes of philosophical psychology, are all too prone to miss the main building and to indulge in wild flights into the gospel of psychoanalysis, the world-reforming reflexology of Russia, psychical research, crystal-gazing, or Heaven knows what fashionable craze. Of all humbugs, however, the novelist would-be-psychologist is the most meretricious, for he (or more often she) has the skill to arouse appetite without the capacity to satisfy it with anything beyond those casual intuitive observations which have been the property of all intelligent people since culture began.

Doubtless there is a public which likes to be told things straightforwardly and dogmatically, or to be given some single, simple, miracle-working explanation—Œdipus complex, inferiority complex, or auto-suggestion. I have written for the reader who wants a sincere contact with the science, its difficulties and its beauties; who is not out primarily for sensation; who will not shy at a stiff argument when it must be met; and who prefers a frank confession of ignorance when the scientist reaches the debatable borders of his subject.

My aim has been to present the subject unfolding itself in its historical settings and intertwined with the personalities of the men who have created it. To have given a photographically complete picture of the group of scientists whose devoted labours have gone to the construction of the whole science would be an enormous undertaking, even if confined to Great Britain; so I have had to choose a mere handful of leading scientists whose lives are representative and lend themselves to the contours of the plan of exposition. Thereby gross injustice has been done, especially if the reader regards these scientists as selected for pre-eminence. What would one say of the perspective of a collective biography which left out, for example, such giants as Galton? I can only plead that I am not making a register, but telling a story, in which the personalities must be subsidiary to the subject studied.

No important branch of pure or applied psychology has been neglected, but in a preliminary treatment such as this I have thought it best to skate quickly over the thin ice covering bottomless theoretical issues. One must face the fact that there are parts of psychology, like parts of mathematics, which can never truthfully be popularized in the sense of being put in still simpler terms. At such points I have attempted the writing of a palimpsest, from which the rapid reader can glean what he wants to know, and which will reveal to the closer scrutiny of the student the profounder problems to which he will be led in the future.

Whenever I meet a group of people gathered to study the science of mind I wonder by what strange and devious path each has come to so uncommon an interest. For intelligent people have long been in the habit of thinking and inquiring about the material world—about astronomy, chemistry, engineering, and all that gives us mastery of the world about us—yet only recently have we reached the stage of sophistication in which we ask about the workings of the instrument of thought itself.

One may turn to psychology from sheer insatiable scientific curiosity; because the mystery of mind is a more fascinating enigma than any found in the material sciences. On the other hand, one may have perceived how much to the point psychology is in the present crisis of civilization, and have experienced, in consequence, an urgent need to solve its problems as a step in the salvaging of civilization. Of what avail is it to drive aeroplanes and motor-cars at hundreds of miles per hour, to shoot shells unheard-of distances, to manufacture endless cheap synthetic food, or even to conquer disease, if nations cannot cure themselves of squabbling like children, of being a prey to suggestion, passion, and prejudice in daily life, and of being chronically unable to organize a spacious, cultured, and healthily progressive social life? It is a new form of the old question which a great philosopher asked of the bewildered villagers of Cæsarea: "What shall it profit a man, if he shall gain the whole world, and lose his own soul?"

'Progress' continues, with a constant flourish of trumpets from the newspapers. Meanwhile, seen only by the psychologist and the medical man, vast new buildings are put up to house the defective and the imbecile. Every year the tragic army of the neurotic and the insane gains fresh recruits. Every year, according to precise statistics, the schools turn out an increasing percentage of mediocre and ineducable types, to join the unemployed and reduce the effective vitality of the nation's industry and culture. We have surpassed all previous civilizations in the extent to which we have mastered and utilized the secrets of nature. It remains to be seen whether we shall penetrate this last secret—the secret of the fragile brain, on which all progress hangs—or whether, satisfied with the external paraphernalia of progress, we shall follow the course of previous civilizations to the dust.

This may seem a pretty nightmare with which to entertain a prospective reader, but one constantly meets little signs which indicate how tardy democracy is to recognize the fact that, unless it shows as much interest and understanding for mental science as it has shown for mechanical and medical sciences, that nightmare will be a reality. To be introduced as a psychologist in most lay circles is to be mistaken for anything from a reader of bumps to an authority on the habits of table-turning spirits. Even members of education committees, to whose guidance we entrust the delicate and promising minds of children, have been known to ask why a psychologist need visit the school when other religious denominations are excluded!

What, then, tempts the few to separate themselves from the uninquiring multitude? The banquet of life is spread for everybody, with a thousand distractions from thoughtfulness; the pageant of social life moves glamorously around us; the engrossing game of business life holds out its glittering prizes; our intense individual hopes and loves and fears hold us in their grip. How can anyone set these things aside, and choose to ponder on difficult and intangible sciences? One's thoughts turn to the austere white monks of whom Dowson wrote:

> From many lands they came, in divers fiery ways;
> Each knew at last the vanity of earthly joys;
> And one was crowned with thorns, and one was crowned with
>   bays,
> And each was tired at last of the world's foolish noise.[1]

A comprehensive despondency, however, must not be regarded as the highway to psychology—indeed, mental science is a natural antidote to depression—yet an insightful scepticism regarding material progress is certainly for some the beginning of psychological wisdom.

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[1] *Carthusians.*

Yet, if I glance in imagination at my typical audience I realize that the majority is motivated neither by purely scientific interest nor by altruistic concern for the social weal. Many of those who compose it are obviously parents, disconcerted by some strange new turn of behaviour in Johnny or Mary, and dimly aware that " Spare the rod and spoil the child " is not the last word on the subject. Some are teachers, cherishing a vision that this new science will show ways of leading the child to the present standard of education in half the time now required. Perhaps the man in the front row, with an expression at once bookish and alert, is a journalist, wishing to systematize his observations on crowd psychology and to improve his craftsmanship through employing a new tool. His well-dressed and genial companion is probably a salesman, intent on finding out more about the mechanism of suggestion and studying human types (a reminder of the dangerous uses of the subject, this ; although courses in ' sales-resistanceship ' for the customer will always be possible). It takes all sorts to make a world, and all types to probe the possibilities of a new subject. I have an uneasy feeling that the respectable and prosperous-looking individual near the door is a confidence trickster, but, on a second glance, it might be only the local solicitor. The quiet little man near him is a local shop-assistant, and I am reminded of the acute psychological insight sometimes developed by that class, as shown in the story concerning the gloomy gentleman who demanded of the shop-assistant, " Have you a revolver in stock ? " " No, sir," replied the resourceful one, " but we have some excellent lengths of blind cord."

An eminent scientist at the close of the last century, Sir William Osler, gazing on the unexplored fields of biology, prophesied that the twentieth century would yield as much progress in the understanding and control of our mental powers as the nineteenth had vouchsafed us in the mastery of the physical world. A third of the century has rolled by: our social life as yet bears witness to no startling applications of this new science, whereas it has been completely remodelled by the discoveries of physical science. The whirling atoms give up their secrets; the vaster distances of the starry sky are mapped and tabulated: but the human mind remains largely inscrutable and uncontrollable. The physicist can tell us how the rainbow weaves its patterns of light; the chemist can describe the processes in the ripening corn: but the processes of the mind as it contemplates these things remain almost as incomprehensible to the scientist as they do to the poet singing:

> Tears, idle tears, I know not what they mean,
> Tears from the depth of some divine despair
> Rise in the heart, and gather to the eyes,
> In looking on the happy autumn fields.

Here is the last, the most fascinating, and the greatest problem awaiting to be unravelled by spirited and adventurous intellects. But it is a region of unexampled complexity, of baffling obscurities and formidable resistances, which at present is left to a mere handful of pioneers. It is like a long battle-line thinly held, awaiting reinforcements. When society sends those reinforcements we can rest assured of advances which will change the whole face of social life, and contribute in an unprecedented degree to human happiness and effectiveness. In the meantime let us see what a handful of pioneers have accomplished.

R. B. C.

CONTENTS

CHAPTER | PAGE

I. THE SEARCH FOR MIND IN THE NERVOUS SYSTEM 17

II. INTELLIGENCE, CREATIVE MIND, AND THE ABILITIES OF MAN 40

III. THE NATURAL HISTORY OF INTELLIGENCE IN DUNCE AND GENIUS 67

IV. PASSION AND IMPULSE: THE ROOTS OF HUMAN ACTION IN ANIMAL INSTINCTS 93

V. FREUD EXPLORES THE BORDERLAND OF MADNESS 118

VI. DREAMS AND LAUGHTER: CHILDREN OF THE UNCONSCIOUS 130

VII. LOVE, LIFE, AND LUNACY 148

VIII. VICTIMS OF THE WILL TO POWER 159

IX. THE COMPLETE ARCHITECTURE OF CHARACTER 169

X. THE MIND OUT OF GEAR 194

XI. ORDER IN DIVERSITY: PSYCHOLOGICAL TYPES 219

XII. WONDERS OF THE BODY-MIND RELATIONSHIP 241

XIII. APPLIED PSYCHOLOGY IN THE SCHOOL, THE FACTORY, THE POLICE COURT—AND THE HOUSES OF PARLIAMENT 265

INDEX 311

YOUR MIND AND MINE

CHAPTER I

THE SEARCH FOR MIND IN THE NERVOUS SYSTEM

IT is the most natural assumption that the mind may be best understood by inquiring into the working of the brain. As early as the time of Plato and Aristotle it was realized that the brain was the seat of reasoning, although Plato was inclined to believe that the soul existed everywhere in the body, and that the emotional part was centred in the region of the diaphragm. The early Greek anatomists, however, had concluded that the brain was a large sponge designed to absorb the hot vapours arising from the tissues of the body. In the medieval world it was just something to be hit with a mace or a battle-axe; and, indeed, we have to come down to quite recent times before any new understanding emerges.

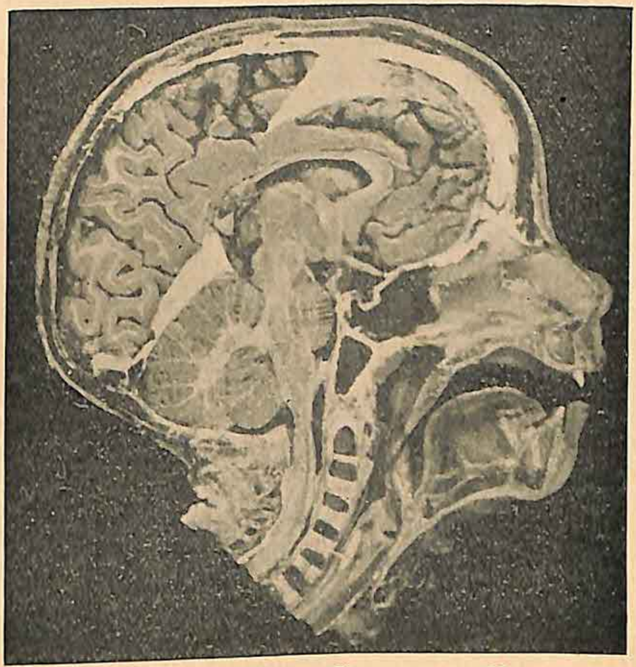
Perhaps the first essay worth recording at a systematic working out of the connexion between peculiarities of conduct and peculiarities of brain structure was that of Franz Gall, a German medical student in Vienna, in the year 1771. This indefatigable little man had one theory—that aberrations of the insane depended upon abnormalities of the brain—but he soon amassed ten thousand facts to support it. Obtaining access to an asylum run by one of his medical friends, he set to work with notebook, sketch-pad, and callipers, taking careful notes of each case, and comparing records of the brain form when the opportunity arrived. He was also to be found in prisons and courts of justice, and became an eager collector of rare human types: persons remarkable for good or bad character, peculiar deficiencies or great talents. His principle of trying to throw light on the normal by studying exaggerated forms is one which has always been found valuable. Since the most exact work required an inspection not merely of the skull, but also of the brain beneath, he soon became noted for an unpleasant habit of hovering around, vulture-like, whenever one of those rare specimens to whom he had devoted much study during life showed signs of quitting it.

In due course he propounded his doctrine of phrenology, according to which particular portions of the brain were to be regarded as the home of definite abilities, character traits, and 'faculties.' So simple and attractive a theory at once evoked a large following, especially in Paris, where Gall had installed himself after the Revolution.

Alas! the progress of brain anatomy has slowly demolished this fine edifice, which, for all Gall's attention to facts, was based primarily on an attractive theory. Firstly, the contours of the skull show very little connexion with the convolutions of the brain beneath, and, secondly, the complex intellectual and moral qualities of which Gall loved to speak—judgment, optimism, firmness of character—definitely cannot be localized in particular compartments. Gall died in 1828. At the post-mortem his skull was found to be twice the usual thickness, and there was a tumour on the back of the brain—a fact which would have interested him enormously. Destiny had decreed that he should spend his life in exhausting an erroneous theory—and that is no useless life.

Two lines of approach have proved most useful since Gall's day: direct experiments on mammalian brains similar to man's, and observation of the effects of accidental injuries, hæmorrhages, and tumours on the actions of human patients.

It was soon noticed that injuries to the hindmost part of the brain led to defects of vision and even blindness, although the eyes and the nerves leading from them might be quite sound. For the same reason we 'see stars' if anything hits us on the back of the head.



SECTION FROM FRONT TO BACK OF THE HUMAN BRAIN IN ITS SETTING IN THE SKULL

Note the cerebellum, at the back, and the connexions with the spinal cord.

As early as 1834 the great German physiologist Johannes Müller had shown that the thing which we experience when a nerve is in action depends not upon any peculiarities of the nervous current, but upon the position of the nerve. Thus the nerve from the eye, whether it is stimulated by touch, by heat, or by an electric current, always gives rise to sensations of light. This may be partially verified by the simple experiment of pressing the outside of the eyeball, as far to the back of the eye as possible, with the finger, when a patch of light will be experienced (on the opposite side to the finger).

Then, in 1861, a physician named Broca studied all those cases in which there was speech difficulty and an inability to express thoughts in words. He found that there was always some injury to an area on the left side of the brain just forward of the ear. Following this localization of areas concerned with vision and with speech came the discovery of special regions concerned with moving the limbs, with hearing, and with taste and smell. For a time it looked as if Gall's ideas were coming true after all, except that the new localization was concerned with special sensation, not with 'faculties'; but many mysterious exceptions began to crop up, and a battle royal arose between scientists supporting localization and those who flatly denied the whole thing.

As we now realize, the 'localizationists,' fired with the success of their first experiments, had been carried too far, and were guilty of filling in the details of the picture with very slender evidence and a great deal of imagination. For example, the frontal lobes of the brain, beneath the forehead, could be put out of action without causing loss of any particular skill or sensation or any loss of memory. In some instances of frontal-lobe injury, however, there had been recorded loss of reasoning ability, of initiative and will-power. It was a simple matter, in consequence, for the localizationists to conclude that the frontal lobes were the seat of intelligence and will.

Upon this controversy there broke the greater yet lesser controversy of the Great War. Bursting shells and flying bullets cast up an indescribable variety of human wreckage. Miracles of brain surgery were performed, while careful

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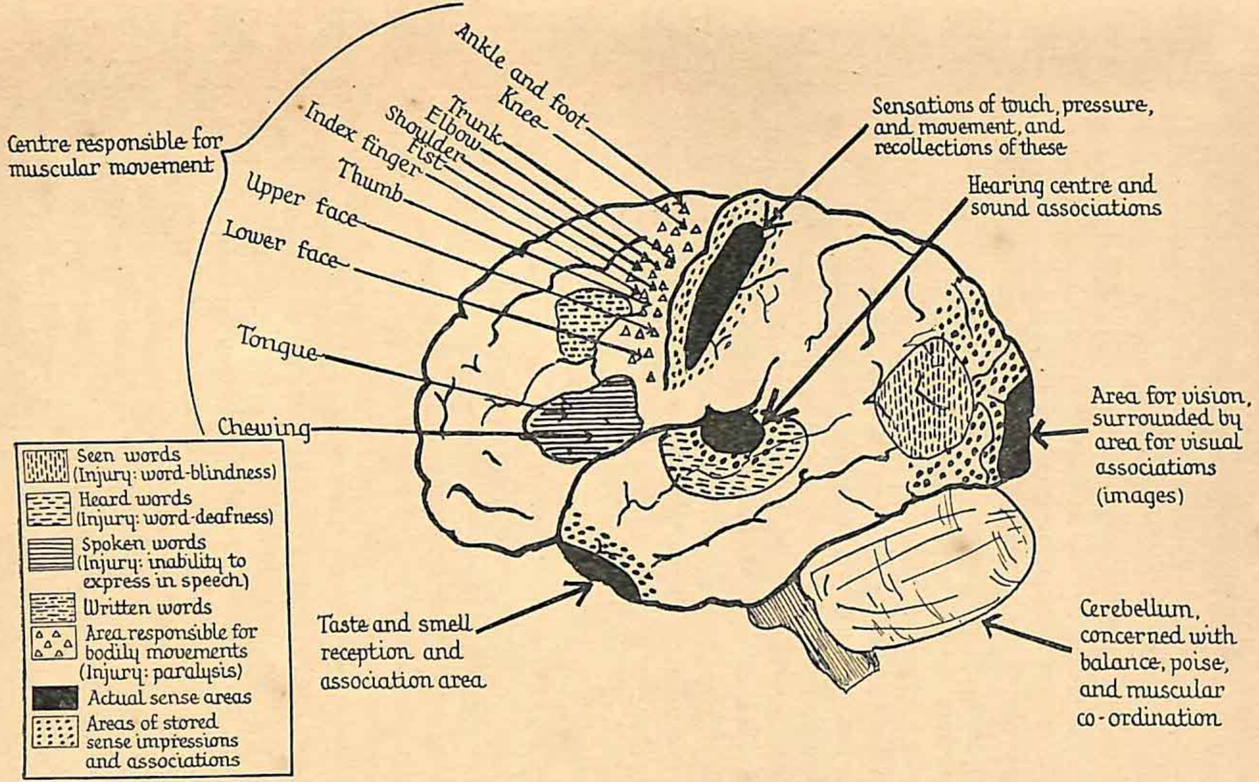

Centre responsible for muscular movement
Ankle and foot
Knee
Trunk
Elbow
Shoulder
Fist
Index finger
Thumb
Upper face
Lower face
Tongue
Chewing
Sensations of touch, pressure, and movement, and recollections of these
Hearing centre and sound associations
Area for vision, surrounded by area for visual associations (images)
Cerebellum, concerned with balance, poise, and muscular co-ordination
Taste and smell reception and association area
Seen words (Injury: word-blindness)
Heard words (Injury: word-deafness)
Spoken words (Injury: inability to express in speech)
Written words
Area responsible for bodily movements (Injury: paralysis)
Actual sense areas
Areas of stored sense impressions and associations

DIAGRAM SHOWING THE EXTENT TO WHICH SPECIAL PARTS OF THE BRAIN ARE CONCERNED WITH SPECIAL FUNCTIONS

The most definitely localized areas are those of the five senses and muscular movement. Other capacities are divided up among the sense and movement areas according to the extent to which these are involved. Thus there is no single centre for words, but a centre for seen words, in the visual association area, a centre for heard words, around the auditory centre, a centre for spoken words, spreading out from the spot concerned with movements of the tongue, and a centre for written words, around the area responsible for movements of the hand. Any one of these capacities may be lost without the others being affected.

recording of injuries and behaviour symptoms led to a great deal of new knowledge for the scientist. X-ray photographs in two planes made possible pretty accurate localization of injury, and more exact psychological tests made possible a better understanding of the nature of the behaviour disturbances.

The foundation of the localizationist doctrine was found to be true. There are definite areas for visual, auditory, and other sensation. Around the visual area is a larger area, in which visual memories and associations are stored, and the same holds for other kinds of sensation. But your memory of the man whom you met yesterday is not in terms of any one kind of sensation—the image of his face has been recorded in the visual part of the brain, the sound of his voice in the auditory association cells, the recollection of his handgrip in another part, and so on. The memory lives in the whole of the brain.

It was this fact which gave some semblance of truth to the curious theory of the philosopher Bergson. Like many people of his generation, he thought of mind and body as very distinct entities, and wished to combat the 'degrading' materialistic viewpoint. In his attempt to prove that the soul was not just a functioning of the brain he carried the war into the enemy's camp, and presented anatomical evidence to show that there were two kinds of memory —one connected with the brain and one not. The former he called 'mechanical' memory, and it comprised such things as ability to write, to speak, to ride a bicycle, to swim, to tie a bow—any one of which might vanish as a result of localized brain injury. The latter he called 'true' memory, and it comprised the recollection of incidents and events in our own lives. We see now why the latter never vanishes with any restricted brain injury. Yet that does not prove it to be independent of the brain, for, as we should expect, it may be destroyed by injury to the whole brain—a fact which Bergson would not contest.

In certain parts localization is very precise. The retina, at the back of the eye, appears to be projected point for point upon the visual area, at the back of the brain. A small shell-splinter in this area was found to give rise to a definitely limited patch of blindness in the field of vision, from the position of which the position of the injury could be deduced. One-sided injury to this area may result in blindness in one eye (on the opposite side to the injury).

Similar observations have provided the solution to an old psychological puzzle—whether blackness is a positive sensation or just the absence of light. It appears that a person suffering from one-sided blindness as a result of brain injury may at first be unaware of his disability, and walk into objects on the blind side. He has no sensation of darkness. Blackness is, therefore, a positive sensation, requiring the presence of nerve cells to experience it.

Colour vision is something additional to black-and-white vision, for it is destroyed separately by injury to the brain, and is the last to return when, through healing, there is recovery from total blindness.

Some amazing results ensue from the destruction of cells in the association area (see diagram at p. 21) when the cells in the actual sensation area are still intact. A German soldier who had survived such injuries from a sniper's bullet could see objects, but read no meaning into them. A street he imagined to be a cornfield, and a bus was a large cow. Piéron, from a study of French cases, tells us that in general there is "an incapacity to recognize objects intellectually; their form may be recognized, but their nature, name, and use are not recalled." One patient, for example, could plainly see a table-fork, because he could draw it, but he did not know what it was or how it was to be used.

Similarly, damage to the sound association zones, not affecting hearing as such, may yet result in word-deafness. Piéron refers to a patient with a tumour, which, producing a partial destruction of the association area, had left a vague and uncertain comprehension of the meaning of sounds. Thus, if the patient were asked to put his little finger into his left ear he would respond by putting his thumb into his mouth. Such patients can understand written instructions quite easily.

Again, restricted injuries in the association fringes of the cell area concerned with muscular movement may cause the loss of particular skills—*e.g.*, to sign one's name or raise one's hat—without producing any true paralysis.

The localization of functions, therefore, does not follow any logical scheme; still less does it fit in with the delightfully convenient personality maps of Gall; but it follows the paths of biological growth. We can read evolution in the brain as we can read history in the quaint ramblings of an old-fashioned town. The localization grew up around the separate senses and the need for muscular response. Nowhere do we see this old foundation so well illustrated as in the handling of words. The printed-word associations necessary for recognizing the little blotches of black on a white page are stored in the visual association area; the recognition of speech lies in the auditory area; the recollection for the writing of words lies around the centre concerned with muscular control of the hand; and the recollection of how to speak words lies lower down in the brain, around the centre for muscular movements of the tongue and throat. On account of this strange dispersion of recollections it is possible, through localized affections of the brain, for a person to be able to read words, but not understand them when heard, to speak a language, but not to be able to comprehend the same words when read. An instance is on record of a patient who understood and wrote—without being able to read his work again—several languages.

Even within the association area of any particular sense there are apparently illogical connexions and absences of connexion which give us clues to the real nature of brain localization. It is possible for a person to forget how to write words, and still be able to write numbers; to forget how to write numbers, and yet to be able to write sporadic dates connected with special memories—*e.g.*, date of birth or 1914—and even to forget certain letters, but to write without error words in which they occur.

Another striking feature, noticeable in the area concerned with controlling muscular movement, is the discrepancy between the size of the part of the body controlled and the extent of the cell layer concerned in its control. As will be seen from the diagram at p. 21, the body is, as it were, marked off segment by segment on the brain surface, the feet being at the top of the brain cortex and the head nearly at the bottom. But the portion concerned with moving the thumb and index finger is many times larger than that for the entire leg. Thus does the brain pay homage to the developments most necessary to civilized life, reversing the order of importance which the sculptor's idealization of the athlete puts before us.

Until recent times most of the knowledge about brain and mind was the result of carefully piecing together the jigsaw-puzzle pieces constituted by records of accidental injury or disease and the losses of function which accompanied them. More daring investigators have studied the effects of directly stimulating parts of the brain with a gentle electric current—chiefly with such mammals as the dog and the ape, whose brains are most similar to man's. Such experiments have been successfully carried out in the motor area, and the animal has raised its legs, altered its facial muscles, and carried out simple movements at the bidding of the stimulated brain cells. In at least one instance the experiment has been performed with a human being—a youth with a scalp wound—who actually thought he was making the movements of his own free will. A pretty problem for the opponents of determinism !

Such findings led to a second period of doubt and revision with regard to the notion of localization. Shortly after the War an American psychologist, Lashley, showed that if exactly the same point of the brain is stimulated on successive days different movements may be produced : a cell may take on the duties of its neighbour when the latter is 'not at home.' Accumulated evidence showed, moreover, that a certain habit or skill, lost through the removal of part of the brain by operation, could be acquired again in most cases through other parts of the brain taking on the function.

Lashley suspected that although localization normally existed, and on much the same pattern for all brains, any part of the brain could do duty for any other if occasion demanded. He saw that the advance of knowledge was slow because there was no one to study and organize experiments, the whole thing being left to chance observations by busy medical men, who were often ignorant of the psychological side of the problem. At this point "a group of public-spirited citizens of Chicago, inspired by the spirit of adventure and enthusiasm for attacking the mysteries of nature, together with the need for scientific information in regard to the problems of human behaviour," got together a fund to enable Lashley to continue his experiments under the best conditions. Doubtless the "problems of human behaviour" are peculiarly insistent in Chicago, but all honour to these nameless citizens who desired to turn the spirit of adventure into such un-Chicagoesque channels !

Under carefully controlled psychological conditions rats were taught to run mazes, to respond to the switching on and off of lights, and various other skilled performances. Particular parts of the brain were then removed under deep anæsthesia by a most delicate operation, and when the rats had completely recovered their vitality they were permitted to perform their old tricks. The animals forgot their skills *in proportion to the amount of brain removed* and *without regard to which part of the brain had been concerned.* When they started to learn again, as if the situation were practically new to them, the new habit was also not localized in any particular part.

The exact psychological knowledge which this new investigator possessed enabled him to discover a significant new fact: that when a given portion of the brain was removed the ability to learn any kind of new trick was impaired, and in direct proportion to the amount of intelligence required to master the new skill. Ability to solve simple problems was scarcely affected, but ability to cope with more difficult situations was much reduced, and *in proportion to the weight of brain removed.*

With these facts before us we are able to catch the full implications of the remark made to the surgeon in the following story. In operating on the skull of a young man he had accidentally omitted to put back all the grey matter. Some years later, meeting the young man at a dinner and melted into a confidential mood by the occasion, he confessed his error. "Don't let it worry you a bit," replied the young man. "I have never noticed the loss, for I am a surgeon myself now."

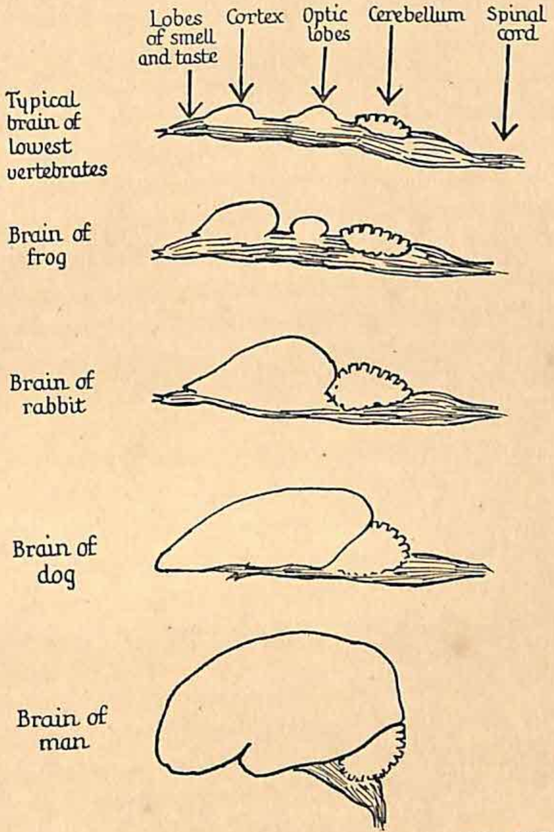
The learning of simple skills is therefore carried on in some restricted area of the brain, and it does not much matter which part, but more general learning, requiring intelligent thought, concerns the whole brain. This links up with the conception which has independently been gained concerning memory: that mechanical memory is located in particular parts, but that true memories are established in several parts at once. And if this is true of ideas of particular happenings, how much more true must it be of abstract thoughts and ideas such as we use when our intelligence is fully involved? Bergson had wished to say that the intellect was not a concern of the brain at all; Lashley showed, instead, that one might weigh intelligence by the pound.

Those of a practical turn of mind will be wondering at this point whether all this implies that big-headed men are the most intelligent.

Recent research shows that the size of the head is only a very rough guide to intelligence, partly because of the varying thickness of the skull and partly because of the different amount of space taken up in different brains by the 'packing' between the grey matter. Nevertheless, two-thirds of mental defectives are microcephalic—*i.e.*, have extremely small heads—and the average brain weight for various races of man is in the same order as the average intelligence. The average brain weight of men, on the other hand, is distinctly greater than that of women of the same race, a fact which makes it difficult to draw such deductions—at any rate, in mixed company.

Obviously some relation between brain weight and intelligence is to be expected from the steady way in which the brain increases in passing along the tree of evolution from the lower animals to man. Most animal brains, even the brain of the huge whale, however big they may be in themselves, are smaller in proportion to the body than is the brain of man. An exception to this is the little humming-bird, whose brain is relatively larger than man's.

But more important than size is structure, and it is the study of this structure which has illuminated brain function from a third independent aspect. Back at the beginnings of things we find the earliest vertebrates managing to get through life with little more than a stalk of spinal cord, with a few swellings developing at one end (see accompanying diagram). The first little swelling is a centre developed to deal with smell sensation, the second, among other things, with control of movements of the mouth, the next (optic lobes) with seeing, and the last with such control of bodily



Stages of Evolution of the Brain, showing how the Newer Part of the Brain (the Cortex) has grown over the Old Stem muscles as is not effected on the spot by the spinal cord. As we ascend the scale development takes place in the way shown in the diagram. The second bulb swells out, especially above, becomes two lobes (seen from the top), which begin to sag like a mushroom-top over the optic and smell lobes.

By the time the higher apes and man are reached these lobes—known as the cerebral cortex—have completely hidden the older parts of the brain, even the cerebellum, under their massive growth. Of course, Nature has other patterns of brain development to follow, even among the mammals, and some animals, living largely by sense of smell, have a corresponding extension of the smell-lobe regions, while others show an exaggerated development of the visual areas.

The general plan—visual areas at the back, hearing at the side, smell at the front—is preserved in all animals. Man and the apes have alone developed extensive areas not concerned with the senses only. In the diagram shown at p. 21 these developments are represented by the uncharted areas, and are mainly at the front of the brain, but also in a strip between the visual and touch areas and elsewhere.

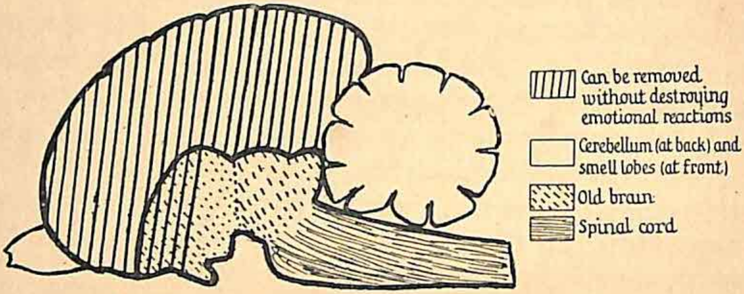
Now, since this growth of the cortex has gone on parallel with an increase in powers of exact perception, reasoning, and emotional control—capacities particularly required of man in civilized life—it is only natural to suppose that the cortex is principally responsible for our more or less fine showing in that direction, and that the older part of the brain stem, now hidden beneath the cortex, is concerned with our older emotional and instinctive life, with cruder perception and coarser action.

As long ago as 1884 Hughlings Jackson, a famous English neurologist, had hit on this clue to the structure of the nervous system, and had shown that from the spinal cord upward it is arranged in a hierarchy of nerve elements, each element controlling the reactions of the elements below and being controlled by those above. The primitive reactions of older parts are not absent; they are merely latent, and are held in check or modified by the later arcs of nervous tissue that have grown up with the expansion of the cortex.

No experimental confirmation of this view could ever be expected directly, for any injury so extensive as to remove the greater part of the cortex could only mean sudden death. Nevertheless, since in the course of anæsthetization the finer, more recent, and more susceptible parts of the brain are the first to be put out of action, one might expect to see something of the unrestricted action of the lower brain in a momentary phase during the first stages of anæsthetization by chloroform, alcohol, and other narcotics.

There is such a phase, in which every emotional expression is immoderate and unchecked. The person laughs inordinately, weeps unending maudlin tears, groans, sings joyously, or waxes violent with aggressive rage. To complete the proof that emotional life arises from the older parts of the brain stem one requires evidence that when those parts are injured emotional life is impaired, although the reasoning capacities are undiminished. Such injury is anatomically almost impossible, if the person is to live, but a few instances are on record of the development of tumours in that region, and careful observation shows behaviour to be closely in accord with that required by this hypothesis. The patients exhibit "a fatuous serenity of mind," "meet jibes and insults with utter indifference," and show no emotion in the face of tragic happenings. They have become philosophers without the labour of building a philosophic system.

Rare cases are known in which, although both cortex and old brain are intact, the connexions between them have been more or less upset. Such patients are subject to uncontrollable fits of laughter and weeping, brought on inevitably and with extreme ease by the slightest provocation. The existence of one patient with this diseased condition was described as "one long roar of laughter." Yet another source of evidence to the effect that the old brain alone is sufficient for all kinds of emotional experience and expression is found in those cases where, through injury to the motor part of the cortex, the patient is unable to move at will the muscles on one side of the face. These same muscles are at once brought to life to give appropriate expression when the patient feels amusement or annoyance: the old brain has its own, ancient, independent control of emotional expression.


Can be removed without destroying emotional reactions
Cerebellum (at back) and smell lobes (at front)
Old brain
Spinal cord

Lengthwise Section of the Mammalian Brain
After W. B. Cannon, "The New England Journal of Medicine," 1926

An exact investigator may object at this point that the above evidence, although it proves emotional action to derive from some centre older than the cortex, does not tell us whether it arises from the old brain or the spinal cord. The Russian neurologist von Bechterev, among others, has answered this by the amazing feat of keeping cats and dogs happily and healthily alive after removal of the whole cortex. They showed readily all kinds of emotional behaviour, the cats spitting and purring, the dogs growling and wagging the tail in the traditional manner. But all these reactions disappeared at once with the removal of the remaining old brain. With the spinal cord alone the animal was only an efficient physiological machine, breathing, digesting, but lacking external behaviour.

Goltz, another neurologist of great skill, reared a dog which had lost its upper brain. It gave every indication of experiencing affection, hate, maternal and sexual impulses. All these reactions were relatively exaggerated, even for the life of a dog, as we may reasonably conclude from the fact that it "went into fits of rage when a fly walked across its nose," and from the fact that it invariably protested angrily on being moved from its kennel, although this was the customary prelude to meal-times. These animals, of course, lose all their learned habits as the result of such a loss of brain tissue, and are completely unable to learn anything again.

In the hope of getting a closer understanding of the functions of higher and lower brain levels, a famous English neurologist, Dr Head, carried out in 1908 a daring experiment upon himself. He severed a nerve that feeds the arm, expecting that as the nerve regenerated itself and feeling returned there would follow a stage in which the older parts of the nervous system would function alone, before the newer, more highly evolved parts had come back into action. Rivers, a psychologist, was to make precise observations on the revival of sensation, feeling, and sense of localization.

They discovered, as had been dimly anticipated, two distinct phases of development. In the first phase of returning sensation warm and cold water felt the same. The prick of a pin on the hand was felt, not as a stab in a particular spot, but as a painful experience vaguely over the whole hand. Only very hot water produced any temperature sensation, and then the discomfort, like that of the pin-prick, was far less tolerable than normally, producing a vigorous and uncontrollable avoidance reaction. Rivers and Head characterized the whole of this primitive form of sensation as "all or none" (not permitting delicate grading and perception), poorly localized, and accompanied by the cruder emotional tones typical of the old brain.

Everything conspires to present a picture of brain structure strangely akin to that of the British Constitution, which has had a long history of 'muddling through.' Old institutions have been preserved and modified in place of making a clean break and a logical reconstruction. History is visible at every point. Every new function is attained by building upon and modifying some existing crude machinery. And the brain shares with political and social institutions the advantages and disadvantages of such methods of growth—stability, some ineffectiveness for new purposes, and unnecessary duplication of functions.

We have gained a sufficiently complete picture of the general plan of the brain to be able to turn without grave misgivings to certain unsolved riddles that puzzle the best minds of to-day.

Why, for instance, should Lashley have found that in making intelligent decisions the whole of the brain is involved, irrespective of the particular subject of the decision? How does this fit in with localization? Let us essay an answer. Every object in the world is related in some way to every other object. To understand anything fully I must be richly aware of its relationships to as many things as possible. To a small child this book is just a coloured, rectangular object, found on the table, and useful in building a tower of bricks. But to me it is a book on psychology, expressing a certain viewpoint related to hundreds of problems that have been stored in my mind; it was bought at a certain time in a certain shop; it is made with materials, and dyed with a dye concerning which I have recently been reading. In short, my perception of it is so much richer that an intelligent decision on my part is far more likely, whether it concerns recommending the book for reading, selling it, employing it in building a model house, or using it to start a bonfire.

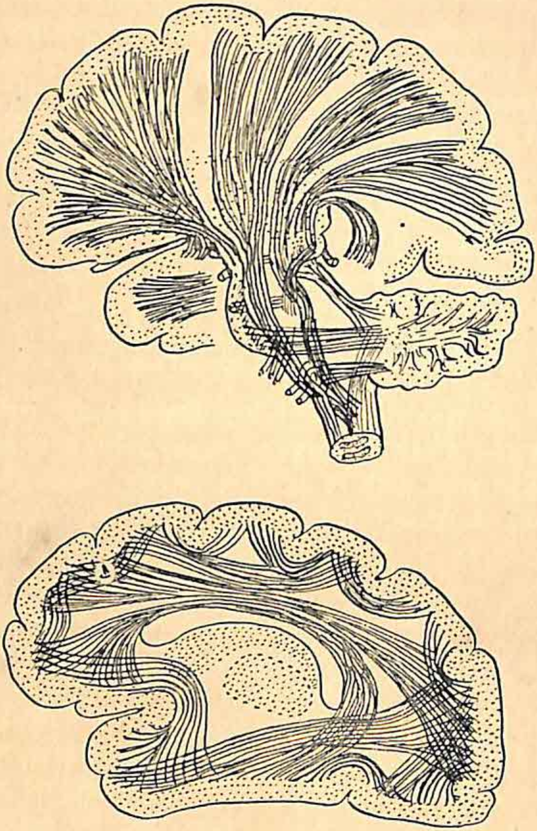
"Flower in the crannied wall," wrote the poet, conscious of this interrelatedness of all things,

> Flower in the crannied wall,
> I pluck you out of the crannies;
> I hold you here, root and all, in my hand,
> Little flower—but *if* I could understand
> What you are, root and all, and all in all,
> I should know what God and man is.

And one of the most striking features of brain architecture is the vault of nerve fibres arching from part to part, connecting with a million living wires the centres for vision, hearing, and speech. No cell lives to itself alone, but is in potential communication with every other cell. This may explain why every part of the brain structure, no matter what its position, is required to contribute its share in the making of an intelligent decision.

It may rightly be objected to this theory that some of the most difficult judgments that we are called upon to form, as, for example, in a problem of geometry, make very little demand upon knowledge or a richness of associated ideas. An alternative theory, favoured by some leading psychologists, supposes that each living nerve cell has associated with it a certain amount of nervous energy. In any effort of concentration all the nervous energy (or neurine, as it is called) obtained by levying a mite from each cell is summoned into a central pool of fluid energy. The greater the number of nerve cells, the greater will be this reservoir of energy; the wider will be the span of comprehension; the more insightful will be the intelligence.

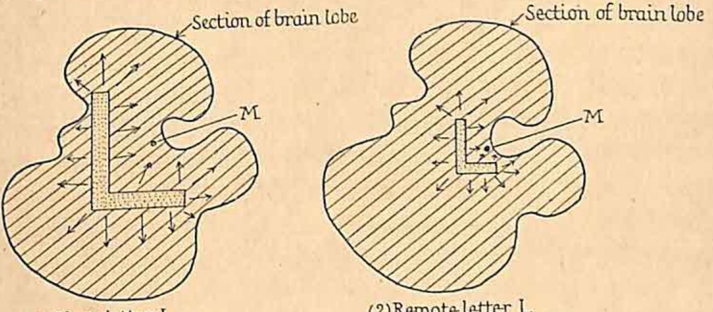
Another big question-mark faces us when we consider the fact that although each function has, as it were, particular lodgings in the brain cells, it shifts its lodgings slightly from day to day, and may make a wholesale migration if its lodgings are destroyed. In machinery—indeed, in any mechanical or material analogy that we can draw—the



PATHS OF CONNECTING FIBRES IN THE BRAIN

Above, section of hemisphere from front to back, showing connecting paths between various parts of the cortex. *Below*, section of hemisphere from front to back, showing connexions with spinal cord and cerebellum.

pushing of a particular button actuates a particular function, and the connexion is an understandable and logical one. But the most recent physiological research seems to indicate that we must give up the idea of a particular stimulation of eye or hand stirring into action a particular brain cell, or of a particular cell in the brain actuating invariably a certain muscle.



(1) Near letter L (2) Remote letter L

DIAGRAM ILLUSTRATING LASHLEY'S HYPOTHESIS MODIFYING THE LOCALIZATION THEORY

Cells stimulated by visual impression shown by dots. Lines of electric field shown by arrows. Although the actual cells stimulated in (1) are quite different from those excited at (2), the reaction may still be the same, because the motor (action) cell, *M*, is in both cases placed in the same electric field (strength and direction).

Lashley's abstruse theory concerning the still more abstruse facts which he brought to light can best be envisaged by conceiving the cortex to be like one of those modern electric signs on which luminous letters move across a forest of tightly packed electric bulbs. Different bulbs come into action from moment to moment, but the shape of the letter remains the same wherever the letter falls. And this is no vague analogy, for we know that, for certain senses at least, the pattern picked out on the brain cells is the same as the pattern perceived—*e.g.*, in vision the pattern on the retina is projected on the visual cell area. But this pattern need not fall on exactly the same cells in order to cause me to react in the right way.

If I am told to turn to the left when I see a big letter L in front of me I succeed in doing so whether the letter is near my eye, and so very large, or distant and small—*i.e.*, even though quite different cells in the visual area are excited. How do I manage thus to react correctly, although quite different cells are brought into action? How can connexions be brought about in the brain if localization is inexact and one party to the appointment turns up in the wrong place? According to Lashley, the stimulation of a certain organ—*e.g.*, the eye—leads to an actual electrical change in cells in certain parts of the brain, so that there is a difference of voltage between these cells and the unexcited cells. If some other brain cell is now brought into action, the effects which it will produce depend not only on its actual position, but also upon the particular electric field in which it happens to stand at that moment.

In a strong electric field falling from the back to the front cells of the brain a particular cell when stimulated may give rise to a distinctly different action from that which it would cause if the fall of electric potential were from front to back. This puts an entirely new complexion on the alleged inconstancy of the nerve cell. It does more: it opens up the way to an altogether more profound knowledge of the brain, to new experimental inquiries, and perhaps—who knows?—to some kind of electrical control of nervous conditions.

But, so far, how meagre is the story! Hundreds of brilliant and eager scientists have flung themselves into the study of this tangled ball of grey and white fibres as if in that study lay the last hope of understanding the whys and wherefores of human thoughts and actions. Those high hopes have scarcely been fulfilled. The harvest is a thin one for all the labour and ingenuity—yes, and suffering—of man and animals that have accompanied the adventure. Perhaps there are some of these baffling problems that are intrinsically too recondite for the human brain to understand.

Perhaps it was only natural for the psychologist first to turn to the brain. Even to-day a medical man may assert that "it is easier to understand an abstract concept like the mind if we understand the concrete thing—the brain—first. Study the simple rather than the complex!" But in view of what has been said we may doubt whether any brain is rightly described as simple—unless it be the brain of this academic medical man.

We may not entirely agree with Tennyson when he exclaims,

> I think we are not wholly brain,
> Not only cunning casts in clay,

but at least the modern psychologist has turned from exclusive concentration on the nervous system, and is developing at a parallel rate a science arising from a direct study of the thoughts and actions, loves and fears of living, striving, and feeling organisms. And so we may turn from this unfinished story of discovery in the nervous system, with its gruesome fascinations, its Grand Guignol and Frankenstein horrors, its baffling inconsistencies, to the yet newer story of psychology proper.

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CHAPTER II

INTELLIGENCE, CREATIVE MIND, AND THE ABILITIES OF MAN

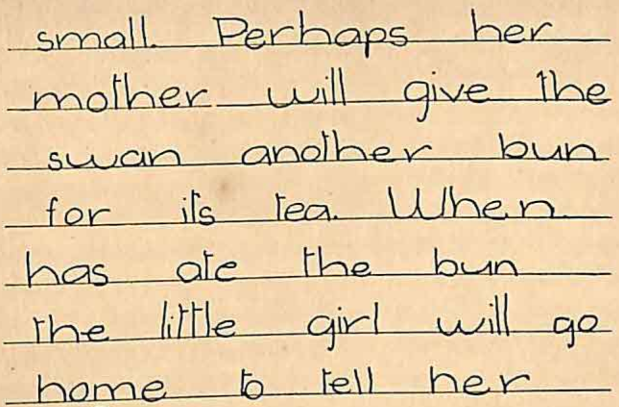
AFTER two years spent in studying history, the Greek language, and the Greek philosophers, John Stuart Mill, at the age of six, commenced to write a history of Rome. Glancing at the opening paragraphs planned by this more than youthful historian, we read :

> We know not any part, says Dionysius of Halicarnassus, of the history of Rome till the Sicilian invasions. After the expulsion of the Sicilians, Iberian kings reigned for several years, but, in the time of Latinus . . .

We do not need to read any further to realize that the style, the vocabulary, and the comprehension shown are those of a boy of fifteen or sixteen years old.

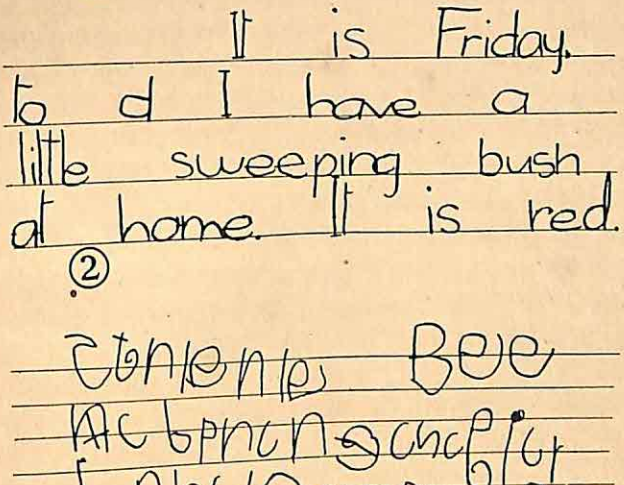
Contrast this mastery of ideas and expression with that of the average infant-school child.

Yet this astonishing performance of the infant Mill could be matched by examples from the early performance of nearly all men of genius—and of a few who never became geniuses ; but that is another story for a later occasion. If such large differences appeared in terms of physical growth—if among six-year-old children we found some little giants with the stature of sixteen years and little dwarfs with the physique of two-year-olds—the question of growth would be considered of immense significance, and would arouse more than the scientist's curiosity. The huge variations, however, in inborn ability to think and imagine were not appreciated until precise



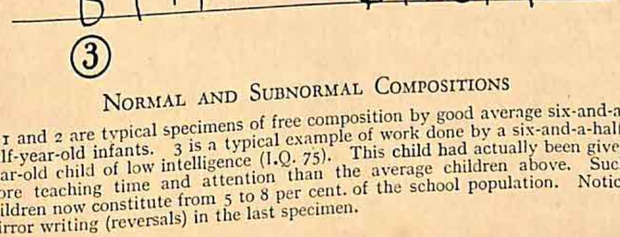
small. Perhaps her
mother will give the
swan another bun
for it's tea. When
has ate the bun
the little girl will go
home to tell her

①



It is Friday.
to d I have a
little sweeping bush
at home. It is red.

②



③

NORMAL AND SUBNORMAL COMPOSITIONS

1 and 2 are typical specimens of free composition by good average six-and-a-half-year-old infants. 3 is a typical example of work done by a six-and-a-half-year-old child of low intelligence (I.Q. 75). This child had actually been given more teaching time and attention than the average children above. Such children now constitute from 5 to 8 per cent. of the school population. Notice mirror writing (reversals) in the last specimen.

mental measurements by psychologists had proved their existence. Nature, as it were, has done with physical evolution, and turns us out all pretty well to the pattern approved by experience, but in the mental realm she is still reaching out to something new, and produces a great variety of experiments.

Scientific curiosity first led to experiments on animal and human intelligence, but the results achieved—concerning the varieties and variations of ability, their growth and decline, the manner in which they may or may not be trained—have put valuable new tools into the hands of the teacher, the doctor, and the industrial employer. Yet when the American pioneer psychologist, McKeen Cattell, founder of the first psychological laboratory in America, went to Germany as a young man and announced his plan of investigating individual differences in capacity, Wundt, the German philosopher-psychologist, smiled sadly, and remarked, "Typically American!" He informed Cattell that he was wasting his time with superficialities. Psychology in those days had much to say of 'mind,' but little of 'minds'; so hard is it for the unimaginative philosophic mind to look past the wood and see the trees!

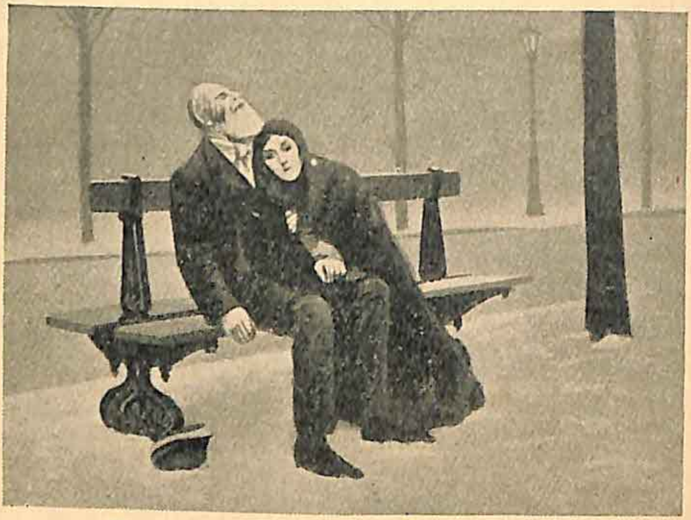
The first facts about intelligence emerged, strangely enough, from a study of those possessing very little of it—mental defectives. That was at the beginning of the present century, when the school authorities of Paris began to take to heart repeated complaints that children of normal ability were being placed in schools for defectives, while the teachers in the normal schools were plagued by what they thought to be more than their share of ineducable children. The complaint was an old one; the element of originality in the situation was provided by the authorities, who actually took steps to find a psychologist who would release them from their dilemma by showing how it would be possible to distinguish with certainty between defective and normal children. They found the right man in Alfred Binet, and their progressive action opened up a whole new field of human knowledge.

Binet was the son of a physician, and had been set to study law, but the ancestral bent was too much for him, and it was not long before he was happily at work in a biological laboratory. This early psychologist was one of those knights-errant of science for whom the most untrodden paths have always an irresistible lure. Animal magnetism, the mentality of microbes, the study of mental diseases—had in turn caught his attention and received illumination from the bright facets of his subtle, inventive mind.

French psychology has always had a practical *flair*, ever since that grandfather of psychology, Seguin (with Itard), succeeded in taming and teaching the famous "Savage of Aveyron"—earning for himself thereby the affectionate title of the "Idiots' Apostle." Binet was a part of that tradition, for as early as 1889 he left the theorist's armchair and founded the first psychological laboratory in the country. On receiving this urgent commission from the Parisian authorities he turned characteristically to first-hand material; he began an intensive study of the mental capacities of his own two children.

His first objective was to devise a means of measuring the level of general intelligence possessed by any particular child—"a metric scale of intelligence," to use his own phrase, which would measure mental capacity "as with a ruler." His procedure turned out to be one of sampling a person's abilities in all directions, by means of ingenious and carefully graded tests of comprehension, memory, judgment, ability to detect absurdities and resist foolish suggestion, cleverness, and *coup d'œil.*

For example, a seven-year-old is addressed: "Do you see this book? Put it on the chair by the door. Then open the door. Then come back here." He has to execute all three commissions without error. Or, again, five numbers are slowly read out—*e.g.*, 9, 8, 1, 7, 6—and the child is asked to repeat them. Then he is given five little cubes, indistinguishable in appearance but varying in weight, and asked to put them in order from the lightest to the heaviest. Two simple designs are exposed to his view for a certain number of seconds, and then he is asked to draw them from memory. A picture is placed before him, and he is asked to interpret it. Then he is asked to state if anything is absurd in such items as, "Yesterday the police found the body of a girl cut into eighteen pieces. They believe that she killed herself."



ONE OF THE PICTURES FOR INTERPRETATION IN BINET'S ORIGINAL TEST

Like a mining engineer wishing to get an estimate of the richness of a mineral deposit, Binet took, as it were, a series of borings at a multitude of points and compounded an average. This was the only theory behind his work, if, indeed, there was any theory at all in the true sense of the word. He scarcely paused to define intelligence before measuring it, and his definitions were always liable to alter overnight in response to some striking thought or new observation. Such caprice, although at times disconcerting to his disciples, was but the hall-mark of a good scientist, and was tolerated unquestioningly by all who knew the charm, the intellectual frankness, the courage, and the love of reality which inspired Binet.

He next introduced the conception of mental age, which has been the foundation of all later work. After arranging his tests in order of difficulty he had submitted them to a large number of normal children, to see just how many the normal, average child of each age could pass. Then if a child being tested passed all the questions normally passed by children of, say, eleven, his mental age would be eleven, whatever his actual age might be.[1] By applying these tests to the sharp but uneducated *gamin* of the Paris streets, to the well-bred child of *bourgeois* parents, to border-line mental defectives, and to all kinds of contrasting types, Binet assured himself that the tests were tapping real ability—mother wit rather than learning —leaving school knowledge and home training aside. He rightly maintained that thenceforth the decision as to mental defect must depend upon a measurement of mental age.

This new instrument, introducing measurement and exactness into an aspect of human experience where measurement had previously never been dreamed of, was completed by Binet in 1905, and immediately achieved widespread recognition, especially in Germany and America, where mental defectives receive considerable attention. Professor Burt, of whom more anon, gave it an English costume and used it to great effect in clearing up educational problems in London—for the English also have their defectives.

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[1] The tests are, in actual fact, graded to fractions of a year, and special arrangements are made for the occasional instances when a child passes all tests up to, say, eleven, fails all twelve-year tests, and passes a few at the thirteen-year level.

Binet never lived to see his technique raised to the degree of perfection that he had envisaged. He died in 1911, more honoured abroad than at home, having spent the last six years of his life in the constant revision and improvement of his methods.

Meanwhile, in England, a mind of a very different stamp was nearing the problem which Binet had handled in so practical a fashion—a mind which was to discover the missing theoretical foundations to Binet's work and reveal principles of vast consequence to the whole of psychology.

We find this man—Charles Spearman—in what may appear a strange place for a philosopher—in the midst of an officers' mess in the British Army before the Boer War. Yet there are good precedents to such a school of philosophy : great soldiers have been famous philosophers, and great philosophers—Socrates, Plato, Descartes—have been soldiers. Nevertheless, this philosopher of an age of libraries and laboratories came bitterly to regret the youthful hours spent in the barrack square. "I had made the mistake of my life," he tells us. "I had given myself up to the youthful illusion that life is long." At first he succeeded in carrying a small library about with him from camp to camp, but we can imagine his embarrassment when this new science of psychology became definitely experimental and his kitbag was faced with the impossible task of stomaching a laboratory.

Here, moreover, was a mind naturally inclined to experiment, and when the theories seething within his brain had reached a certain degree of clarity the hunger for experimental proof would brook no more obstruction. Spearman threw up his commission, and got to grips with the problem. What military science lost we do not know: we can but be grateful for the genius which psychology gained at a critical point in its development.

Professor C. Spearman, F.R.S., the Originator of the *g* Hypothesis of Intelligence

Photo Vandyck

Before Spearman's contribution can be understood a glance must be thrown over the conflicting theories about intelligence which then held the field.

Binet seemed to think that there was no such thing as a single power of intelligence, but only a bundle of varied and unrelated abilities—"a crowd of faculties." According to this view, a person might be a genius at mathematical problems, a perfect fool at expressing himself in writing, averagely good at dealing with people—and so on, with the wildest ups and downs as we pass along the list of his abilities.

Others, notably Thorndike in America, believed intelligence to have but three or four main roots. They brought evidence to show, for example, that a man who is good at one branch of mathematics is invariably of great potential ability at all other things of a mathematical nature, while at the same time he may be poor in all abilities that have a common root in language.

Spearman contended that records of exact testing of living individuals, inadequate though experimental records then were, fitted neither of these views. Intelligence was, as it were, neither a host of little independent businesses nor a few big firms: it was rather a single big combine entering into co-operation in various regions with local businesses. A person in whom this central power is well developed will, therefore, tend to do well in everything—like the Admirable Crichton—since its influence extends to every kind of performance; and the unfortunate who has little of it will be equally a dunce at arithmetic, writing, reading, and the strategy of a game of marbles.

Appearances do not favour this 'unifocal' theory, as it has been called, for we all love to tell of geniuses who were surprisingly weak or stupid in some direction remote from their special line. Such stories are all too frequently sops to the envy of the multitude or the common love of the bizarre, and vanish on scientific investigation. Spearman pointed out, however, that the central power is not all-important: there are two factors determining every performance, and frequently the second of these—the small regional 'business'—is more important than the central power. Secondly, he reminded those who judge from appearances that the individual's interests have not been allowed for, and that these cause him to use his latent capacities to much better effect in some directions than in others. And with this challenge he set out to discover some statistical tool which would enable him to penetrate beneath appearances.

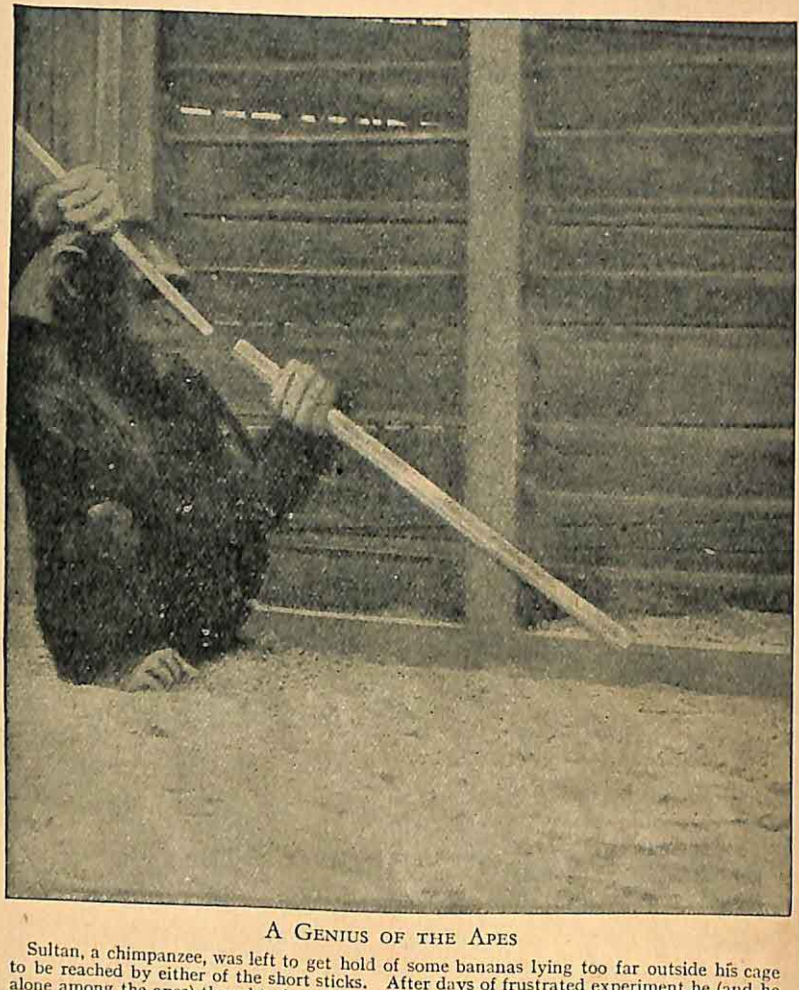
Meanwhile there were scientists who were seeking to define intelligence by a study of its special manifestations.

All of us are daily making judgments concerning other people's intelligence, yet how few would care to give an exact definition of what is being estimated! Psychologists like Terman, in America, who made careful comparisons of normal with mentally defective children, concluded that intelligence was "the ability to think abstractly." For this capacity most conspicuously decreases in passing from bright to dull children, whereas the latter may show an apparently normal skill in dealing with real things—*e.g.*, in carpentry, gardening, and even drawing. Most people, too, are more conscious of mental effort in grasping abstract notions of space and time, mathematical formulæ, and philosophical principles than in dealing with concrete situations embodying those principles—*e.g.*, playing ping-pong, giving change for sixpence, or engaging in an ordinary conversation. It may be objected that such a definition puts abstract thinkers like the philosopher and the mathematician in an exalted position relative to the engineer and the politician, whom we nevertheless regard as highly intelligent, and who

PROFESSOR KÖHLER, OF BERLIN

At the outbreak of war Köhler found himself on the sun-scorched island of Teneriffe, cut off from his native land by hostile cruisers. In this isolation and under great difficulties he began his experimental studies of the mentality of apes, and enriched psychology with some important discoveries.

Photo C. H. Stoelting and Co.



A Genius of the Apes

Sultan, a chimpanzee, was left to get hold of some bananas lying too far outside his cage to be reached by either of the short sticks. After days of frustrated experiment he (and he alone among the apes) thought of pushing one stick into the hollow end of the other. Thus he attained his prize. One of the genuine examples of animal insight provided by the carefully planned experiments of Professor Köhler.

From "The Mentality of Apes," by Professor W. Köhler. By permissio
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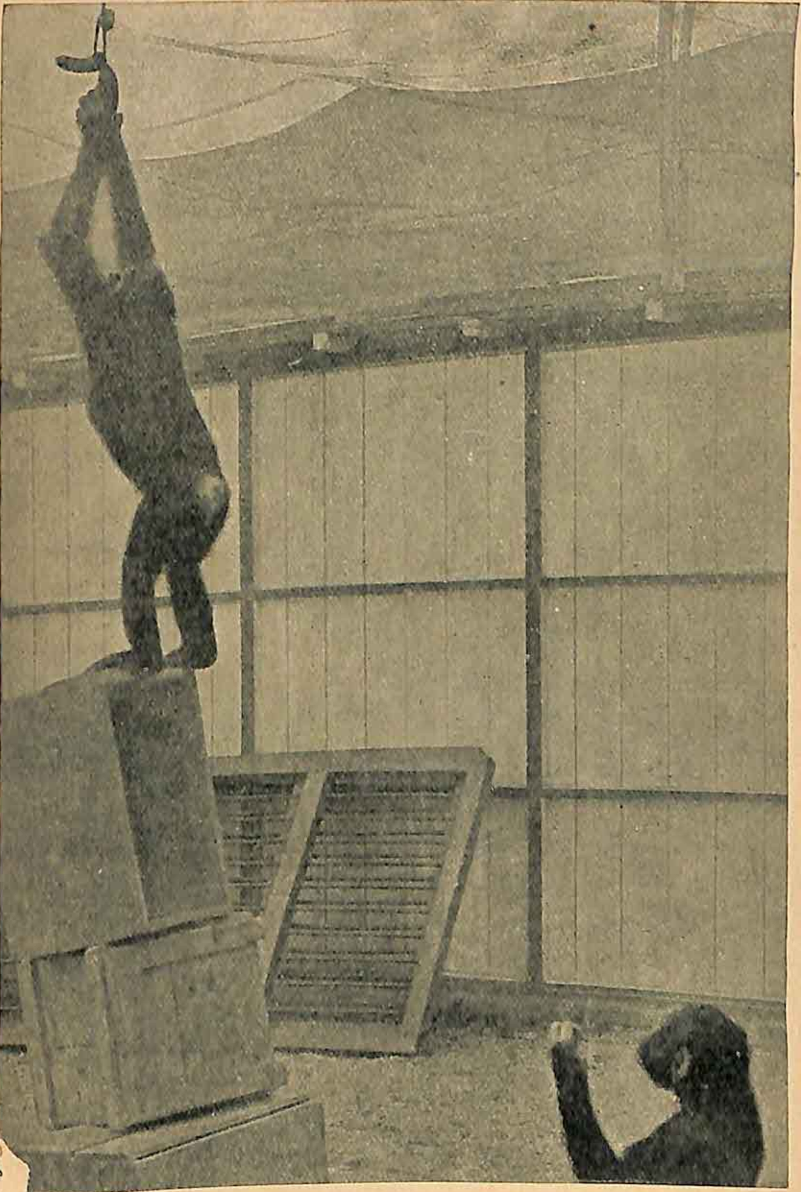


An Ape who thought of building a Skyscraper

is ape reached the bananas by utilizing the boxes provided (without suggestion) by Köhler. ture is about as skilful as the brick tower of a child of two. Notice the sympathetically and of the absorbed (and doubtless admiring) assistant.

From ' The Mentality of Apes," by Professor W. Köhler, by permission demands more intelligence it does not necessarily get it; that social rewards are such as to produce more good engineers than good philosophers.

An apparently very different formula for intelligence has been arrived at by naturalists and psychologists who have contrasted the behaviour in problem situations of higher and lower animals. They have concluded that intelligence is "adaptability to new situations," since the more primitive species are easily nonplussed by any change in their environment, and generally continue to strive for goals in the same traditional fashion, however inappropriate it may have become; whereas the more developed species perceive some new response which can be made to enable them to gain their ends in spite of novel difficulties and obstructions. Put the dog's food in an unusually high place, and he will continue jumping up at it in the same stereotyped way until he is tired. A monkey may give up this direct method, and attempt to hook the food down with a branch or something resembling a stick, while a young child or an individual genius among the higher apes (see photo at p. 51), after a moment's consideration of both these methods, will think of fetching a chair or a box to stand on. Moreover, is not this ready adaptability of means to ends an outstanding characteristic equally of great military minds like Napoleon and great scientific intellects like Faraday? Again we recognize it as the main mental process in wit. Says Brown to his class-mate, "I can beat you at making ugly faces, Smith Major." "Very likely," replies the latter, perceiving a new aspect of the situation, "but look what a start you've got!"

School-teachers, who are notoriously as plaintive about the supply of intelligence as farmers are about the weather, have nevertheless been responsible for yet another approach to the definition of intelligence. To the teacher the intelligent boy is the one who can learn quickly. Memory may have some part in this, but, after all, apart from parrot learning, memory can only work on what has first been understood. From this beginning we gravitate to the definition of intelligence as "the capacity to profit by experience," or, as it has been still more finely expressed by the psychologist, "the capacity to acquire capacity."

Interesting and valuable though these approaches may be, they cannot alone lead us to knowing what intelligence is. The whole proceeding, indeed, may be as arbitrary and pedantic as the idle labours of those early naturalists who sat at home and defined with great precision the anatomical structure of the unicorn and the sea-serpent. The beast must first be captured.

So, while the battle of verbiage rolled to and fro between the compilers of psychological dictionaries, Spearman began his first experiments, having discovered the statistical method which would enable him to decide from his results whether intelligence is arranged on a unifocal or a multifocal plan. In a little village school in Berkshire the children were tested in many different abilities. They lifted rows of weights and found the order of heaviness; they solved ingenious puzzles, detected absurdities in statements, and supplied missing words in sentences. After that, since the influence of special education and home culture must be analysed, this persistent scientist repeated the proceedings with all the boys at a preparatory school for Harrow.

An attempt to explain the abstruse mathematics behind this work would be out of place here: suffice it if the principle is roughly sketched. Briefly, if the same mental capacity underlies performance in two apparently different abilities—say, that for French and that for algebra—the order of all the boys in one subject will be the same as their order in the other. If, on the other hand, the two abilities are quite unrelated and spring from independent roots, Smith, who heads the list in French, may fall anywhere on the algebra list, and Jones, who brings up the rear in algebra, may, as like as not, appear in the van of the French scores. A 'correlation coefficient' worked out from two such sets of scores will tell us the precise amount of ability common to the two performances. It varies from the value 1, when the two orders are perfectly related —*i.e.*, identical—to 0, when they are quite unrelated. Some idea of the meaning of such a coefficient can be gathered from the fact that the statures of fathers and sons are correlated to the extent of about 0.5. By taking all sorts of abilities in pairs and calculating correlation coefficients one tries to discover whether there is any ability common to them all, just as a surveyor, by taking a series of points in triangles, may determine the contours of a hill.

The verdict of months of calculation was unquestionably in favour of the hypothesis that our abilities are constructed on the plan of a single large general ability—which Spearman called *g*, but which we may prefer to call 'intelligence'—working in association with a large number of small special abilities—which he called *s*'*s*—each operating in a restricted field, mathematical, musical, artistic, mechanical, etc. This became known as the "two-factor theory," since every performance is partly determined by the amount of *g* and partly by the amount of *s* possessed by the individual concerned.

Under the challenging title *General Intelligence objectively determined and measured* this epoch-making proof appeared in 1904, actually a year before Binet's scale. Like most conceptions that are too profound for the majority, it was slow in gaining attention. Yet this article in an obscure scientific journal, sandwiched between a rambling philosophic discourse on the soul and an essay on the psychology of the English sparrow, marked the dawn of a new day in psychological knowledge.

From this moment there was no pause, for London University, with an appreciative eye for new sciences, put Spearman at the head of a new department—experimental psychology. Soon he had gathered around him a little army of brilliant students from all corners of the globe, and these he marshalled, with the skill of a master strategist, for a swift and purposeful attack on the newly discovered kingdom. He sits at headquarters, this tall man with the grave and kindly face, receiving messages from all fronts, co-ordinating ingeniously planned advances, demolishing apparently insuperable obstacles with an intellect of astounding penetration.

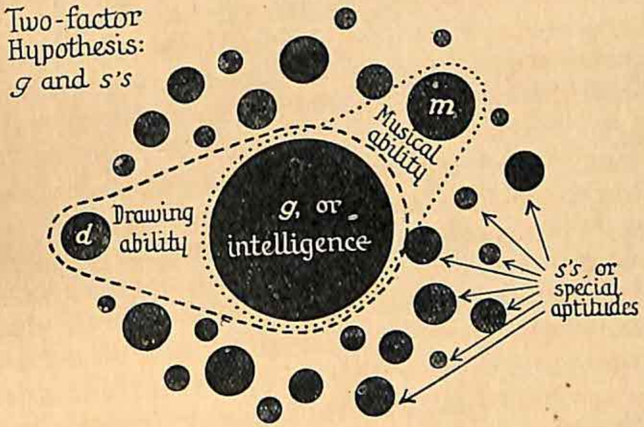

Two-factor Hypothesis: g and s's
m
Musical ability
d
Drawing ability
g, or intelligence
s's, or special aptitudes

Diagram showing how Two Abilities (Musical and Drawing) are each made up of g and One Special s

The limits of the field of action of the general ability, g, were first mapped out, and the relative importance of g and s's in all kinds of skill was accurately estimated. Here are some of the early results:

Success in mathematics is 9 times as dependent on g as on s.
Success in classics is 9·5 times as dependent on g as on s.

Success in drawing correct inferences is 4 times as dependent on *g* as on *s*.

Success in music is 3 times as dependent on *g* as on *s*.

Success in drawing is ¼ time as dependent on *g* as on *s*.

In other words, granted sufficient interest and opportunity, success in mathematics or classics is a good indication of high intelligence. The tradition of selecting men for leading posts in the civil service, for positions requiring shrewd diplomacy and the intelligent government of subject peoples, merely on their success in an academic examination in classics is apparently not so foolish after all. And the relatively small part played by *g* in musical and drawing ability (at least in the early stages) explains the not infrequent observation that mental defectives may show astonishing virtuosity in drawing, and the circumstance that highly intelligent men may sometimes be unable to tell the difference between *God Save the King* and a negro spiritual (except by the fact that one stands up for the former).

Another riddle solved by these research-workers was the relation of quickness and intelligence. Is the person who is slow to grasp the significance of anything necessarily unintelligent? And what of cleverness and originality? How much of imagination is just ordinary intelligence? Speed of comprehension does seem to be a function of intelligence, providing that the subjects of the experiment *are consciously set to think as quickly as possible*. Under natural everyday conditions, however, the quick thinker—*i.e.*, the one who naturally tends to think quickly—is often a shallow thinker. Quickness is, then, a function of temperament. We will take up this question along with the others when we study what is known of temperament differences.

We seem to have shelved the question "What is intelligence?" At this point the psychologists had reached the stage with regard to intelligence that Faraday and his fellow-physicists had reached with regard to electricity:

they could detect it, predict where it would appear, and measure it, but could not describe its essential nature. Yet the tests to measure it, arrived at by wide experiment designed to pick out performances most highly 'saturated' with *g* (by correlation evidence), offered a clue. Let us glance at some of the most saturated tests :

I. **Detection of Absurdities** has proved a good test with young children. The present examples are from a test for children of from eight to eleven years of age. The child has simply to underline *Sensible* or *Silly*.

1. It is a good thing to learn to cut your finger-nails with your left hand, for you never know when you may lose your right hand in an accident. { SENSIBLE.
SILLY.

2. One man stopped another in the street. "Pardon me," he said. "I recall your name, but I can't remember your face." "I am not surprised," answered the other. "It is such a long time since we met." { SENSIBLE.
SILLY.

II. **Completion Test.**—This was first used in some early experiments in Germany. The following example is for children of from eleven to fifteen years of age :

INSTRUCTIONS.—In the following passage some of the words have been left out. You have to fill in the blanks, with one word or expression to each dotted gap, so that the whole piece sounds sensible and right. Do not actually write words in the spaces, but, in each case, choose one from the row by the side that is numbered the same as the blank you are dealing with, and underline it :

As the shipwrecked . . . (1) . . . sighted . . . (2) . . . they were filled with . . . (3) . . ., for they had been afraid of meeting . . . (4) . . . while still far out at sea.

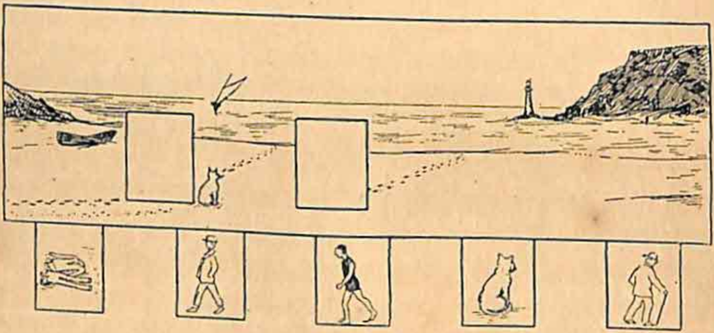
(1) policemen, travellers, sailors, seagulls.
(2) fire, food, rain, land.
(3) anger, relief, expectation, mirth.
(4) storms, fish, harbours, men.

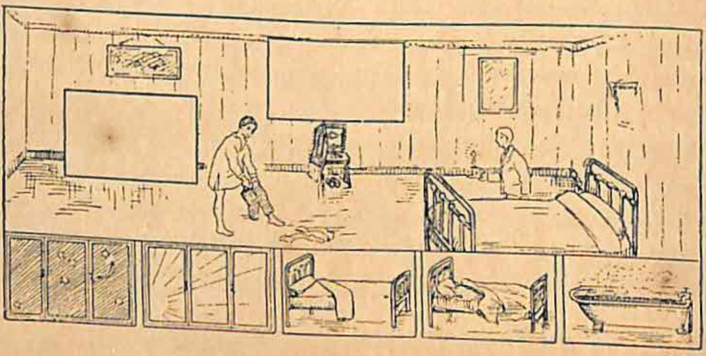
The following is from a test for adults :

A . . . (1) . . . man will often . . . (2) . . . to give advice even on subjects about which he . . . (3) . . . little ; for his sense of his own importance is pleasurably . . . (4) . . . by the . . . (5) . . . that another person is depending upon him.

(1) kind, conceited, proud, ignorant.
(2) begin, refuse, ask, try.
(3) cares, knows, thinks, talks.
(4) aroused, awakened, increased.
(5) hope, belief, knowledge, mistake.

For children of from eight to eleven years, who may not be able to read, the same test can be given in pictorial form, the child being asked to fill in the two blanks in each picture with two of the five insets offered below each of them :





III. **Classification.**

INSTRUCTIONS.—Look at these five words:

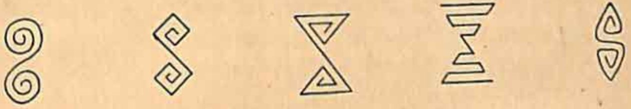
Red, green, blue, wet, yellow.

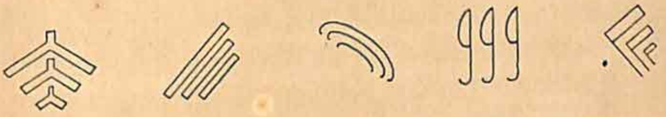
They are all names of colours except 'wet,' so 'wet' is underlined. In the test you must underline in each row the word that does not belong to the same class as the other four.

Oak, ash, grass, fir, elm.
Some, all, often, none, most.
Growl, speak, hum, whistle, whine.
Monotonous, uneven, zigzag, wide, regular.

The first pair of the above examples is from a test for children of from eleven to fifteen years of age; the second pair is from a test for adults.

The same principle can also be used in non-verbal forms, as in the following examples, in which the subject has to underline the shape not in the same class as the others:





IV. **Inferences.**—The ability to reason to a correct conclusion from given facts is, as would be supposed, a good test of *g*: yet for some reason it is not quite as good as the classification test above or the analogies test below.

INSTRUCTIONS.—Choose the right answer to the problem, and underline it (or indicate it by means of a cross):

1.[1] Jane is taller than Mary. Harry is taller than Jane. Who is shortest?

(1) Jane, (2) Mary, (3) Harry.

---

[1] From a test for children of from eight to eleven years.

2.[1] If Joan's mother is my father's sister, what relation is Joan's father to me?

(1) Cousin, (2) Father, (3) Grandfather, (4) Uncle, (5) Brother.

3. A woman who had fallen in the water was dragged out in a drowning condition by a man who had jumped in after her; but she did not thank her rescuer, because

(1) She never felt thankful for small things.
(2) She did not know the man well enough.
(3) She was feeling better.
(4) She was still unconscious.

4. The following instructions were issued with a piece of machinery. Is there any sentence that need not be there? If so, mark a cross against it.

(1) Do not press the button unless the tap is closed. ☐
(2) As soon as the engine begins to run, press the lever A, which opens the tap. ☐ The tap can only be kept open as long as the engine is running. ☐
(3) To lubricate engine press button. ☐ This must not be done while the engine is running. ☐

V. Analogies.

INSTRUCTIONS.—First read this example:

'Sugar' is to 'sweet' as 'vinegar' is to (salt, yellow, liquid, sour, oily).

Sweet describes the taste of sugar, so the word that describes the taste of vinegar is chosen and underlined.

Read this example also:

'Man' is to 'boy' as 'cat' is to (girl, mouse, puppy, kitten, father).

Now work out the following examples in the same way:

'Wear' is to 'clothes' as 'eat' is to (hat, table, food, plate, fork).

---

[1] Nos. 2, 3, and 4 are from a test for children of from eleven to fifteen years.

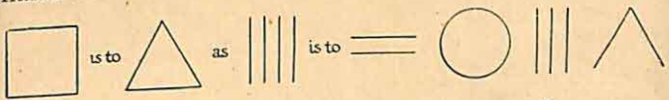
'Inch' is to 'ruler' as 'hour' is to (clock, week, time, minute, late).

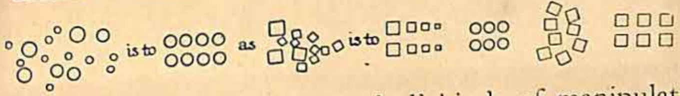
'Event' is to 'truth' as 'portrait' is to (likeness, colour, beauty, skill in painting, artist).

'Soon' is to 'never' as 'near' is to (not far, seldom, far away, widely, nowhere).

The first pair of examples under "Analogies" is from a test for children of from eleven to fifteen years of age; the second pair is from a test for adults.

This principle can also be clothed in forms making no demand on verbal knowledge:

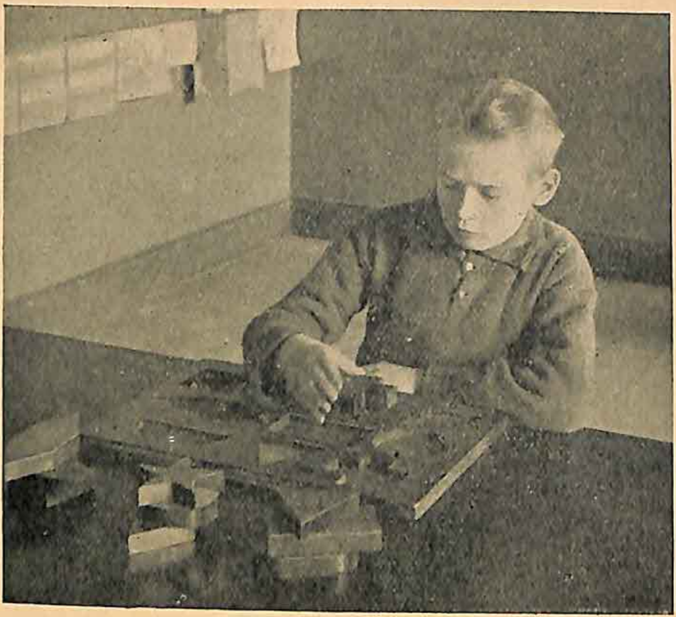




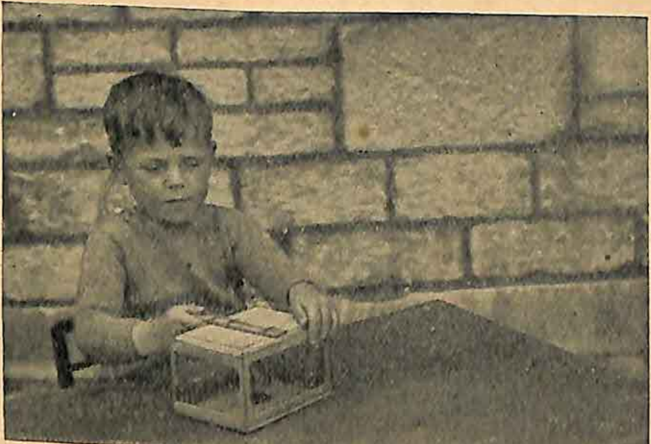
There have also been devised all kinds of manipulative 'performance tests' for use with deaf or dumb children, with foreigners, and with those who lack the minimum familiarity with language necessary to do the ordinary intelligence test. The accompanying photographs show such tests in use with children and adults.

A special study has recently been made of tests for very young children. Here the principal difficulty lies in the fact that the fickle will and fluctuating interest of the child leave one in doubt as to whether the full power of his intelligence has been brought into action. One successful test, shown at p. 62, consists of a puzzle box in which all the mechanism is open to the eye. A sweet or an attractive toy is put in the box, and the child is left to his own devices to get it out.

In America an attempt has even been made to estimate the varying intelligences of infants in their cradles. Gesell



PERFORMANCE TESTS OF INTELLIGENCE
A boy being timed on Seguin's form board (Haddenham Road Experimental School, Leicester).



A FIVE-YEAR-OLD BOY SOLVING A PUZZLE-BOX PROBLEM
An intelligence test for very young children suggested by Köhler's experiments with apes.

worked out a number of standard situations normal to the development of babies, and fixed the ages at which each is mastered.

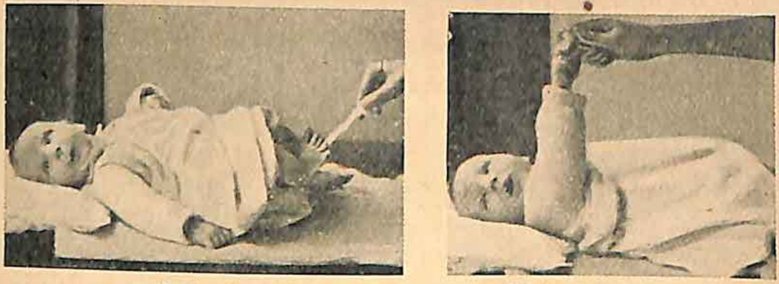
Thus:

At 12 weeks child's eyes first follow small ball or plate moved across field of vision.
" 16 " child regards largish cube placed on table.
" 20 " child regards small pellet placed on table.
" 24 " child reaches for and grasps a spoon.
" 32 " child pokes the pellet and opposes finger and thumb.
" 44 " child pulls a string to bring an object attached to the other end towards itself.

AN 'INTELLIGENCE TEST' FOR A THREE-MONTHS-OLD BABY

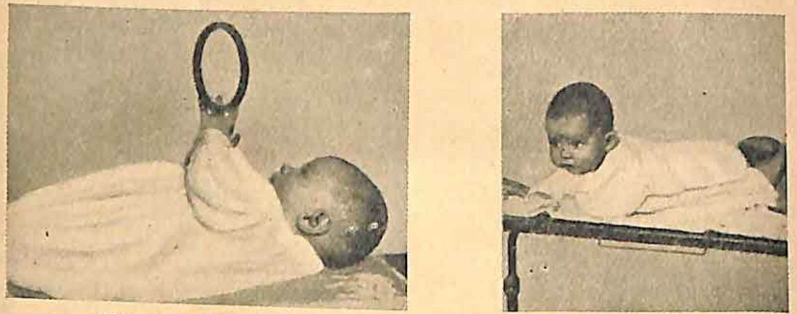
The average age at which babies will first follow with the eyes a plate slowly moved in this way is three months. Here is a bright baby of two months succeeding in this test.

Such tests, skilfully given by a psychologist, will at least indicate whether an infant is possessed of normal, subnormal, or brilliant capacities.



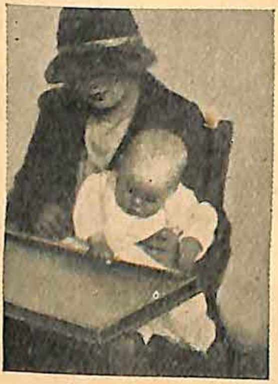
Toe-fanning. Resists rod-withdrawal.

Child at One Month



Closes in on a dangling ring. Erects head when prone.

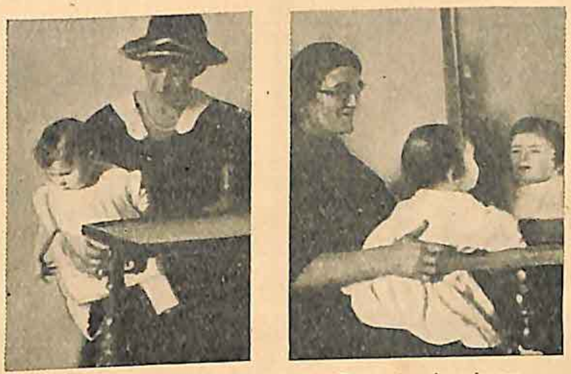
At Four Months



Scoops up pellet.

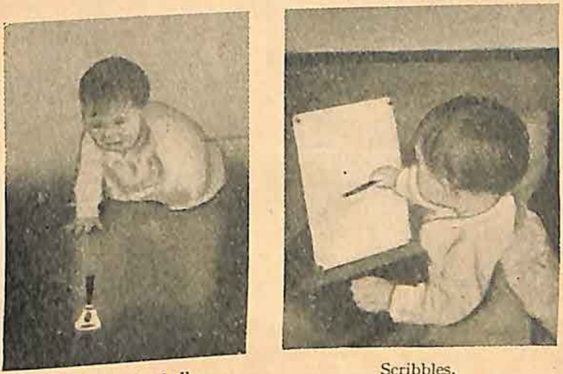
At Six Months

From "The Mental Growth of the Pre-School Child," by Arnold Gesell. By permission of the Macmillan Company. New York.



Looks for fallen spoon. Reacts to mirror image.

CHILD AT NINE MONTHS



Crawls for bell. Scribbles.

AT TWELVE MONTHS

From "The Mental Growth of the Pre-School Child," by Arnold Gesell.
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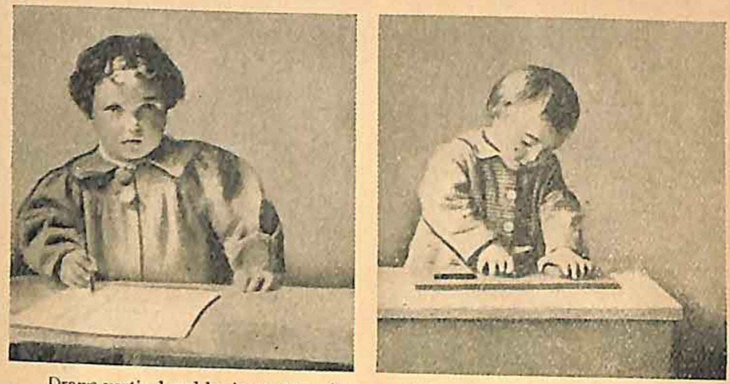
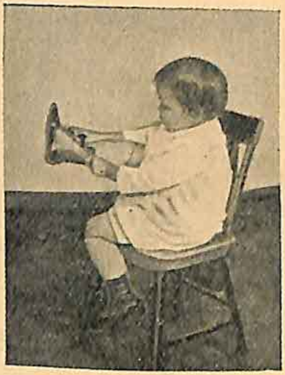


Draws vertical and horizontal lines imitatively.

Solves three-hole form-board puzzle.

CHILD AT TWO YEARS



Puts on shoe.

AT THREE YEARS

From "The Mental Growth of the Pre-School Child," by Arnold Gesell.
By permission of the Macmillan Company, New York

CHAPTER III

THE NATURAL HISTORY OF INTELLIGENCE IN DUNCE AND GENIUS

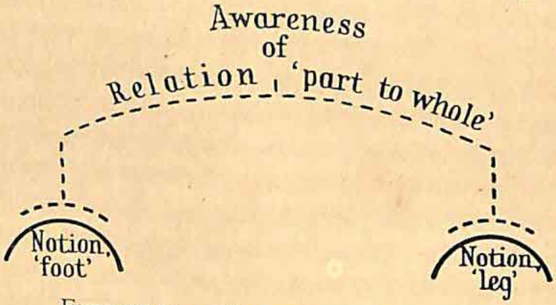
Each of the definitions of intelligence—" the ability to think abstractly," "the capacity to acquire capacity," and "adaptability to new situations"—is seen to have some connexion with the operations of essential intelligence as revealed in the tests considered in the previous chapter; yet each is partial, and somehow misses total expression of the nature of intelligence. The genius whose methods had led to the devisal of reliable tests had yet wrestled for years unavailingly with the problem of a comprehensive formula.

" Then at last," Spearman tells us, " as sometimes a long-standing fog suddenly lifts to disclose a smiling landscape, my mental view most unexpectedly cleared up." The credit for the revelation belongs to a travelling companion in a railway carriage. He was the commander of a training station for submarine officers (during the War). These travelling companions had begun by discussing the cultivation of originality in tactical thought. The professor soon discovered in this worthy scientist of the sea an anvil of the right temper for the hammer of his intellect. How could the captains in charge of these precious engines of destruction acquire that ready " adaptability to new situations " which so frequently decided between life and death in this strange new warfare beneath the waves? Reduced to these stark elements, the character of the mental processes involved in the functioning of *g* became clear as never before. *g* must be nothing other than the ability to grasp complex relationships—to perceive the full significance of the way in which one thing stands to another! "All these thoughts," says Spearman, "ran through my mind in the time that it takes to light a match. I no longer remember how I replied to my companion, but only that I ungratefully longed to be alone. I had come upon a treasure chest, and was impatient to see what was in it."

Let us look at this more fully, and take for the purpose a couple of items from an intelligence test, say the analogies test, which is one of the best of all so far produced:

'Foot' is to 'leg' as 'hand' is to ——
'Black' is to 'white' as 'no' is to ——

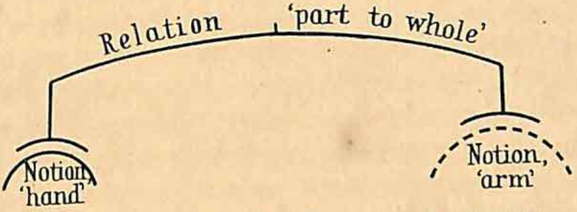
On perceiving the first two items—'foot' and 'leg'—the relationship that exists between them rises into consciousness (or subconsciousness)—"the end of a thing to the thing itself." This we may put schematically thus:



EMERGENCE OF RELATIONSHIP FROM THE AWARENESS OF TWO 'FUNDAMENTS'

In our thoughts there is first an awareness of the nature of each of the first two 'fundaments' (as we may call the given items), and then an awareness of the particular way in which they stand to each other. Having obtained this relationship, we then apply it to the third fundament, 'hand,' and the relationship picks out for us from the storehouse of our ideas—with the certainty with which a plotted course on a map leads the navigator to a previously unseen island—the idea 'arm.'

Similarly, the relation 'oppositeness' rises in my mind when I contemplate the fundaments 'black' and 'white.' This applied to 'no' causes 'yes' to spring into consciousness. To be exact, the relationship rises clearly into awareness only when my intelligence is sufficiently powerful. If it is not I fail to 'tumble to' any relationship, or I get an unclear picture of it which steers me to an erroneous fourth term, as would be the case if I gave the answer 'glove' or 'body' to the first of the above analogies. The fat lady who could only get out of a railway carriage backward, and was promptly pushed back into the train by would-be-helpful porters at every station where she tried to emerge, was the victim of an unclear perception by the porters of her possible relationship to the carriage. In the same way a man may perceive only the relationship of 'distressed person and aggressor' in a wife-beating, and come to grief accordingly. The full complexity of the relationship may or may not dawn upon him, according to his amount of *g*, when he incurs the unexpected attack of the protective and possessive female.



EMERGENCE OF A NEW 'FUNDAMENT' THROUGH APPLYING KNOWN RELATION TO KNOWN FUNDAMENT

It is nothing but this process (of 'educing' relations and producing new fundaments with their aid) which lies behind the highest flights of creative genius. By exercising this power Newton weighed the earth and Einstein piloted himself and us into a new universe. Whence do new ideas come? Not from the storehouse of memory, for how could they have got there? And very rarely from a purely accidental rearrangement of ideas and fragments of ideas. Some person, searching in a certain direction and constantly applying a variety of relationships to a few fundaments, applies a relationship to a fundament with which it has never previously been coupled, and an entirely new fourth term appears—an idea that has never been contemplated in human thought before. Trevithick contemplated, as every one else had done, the way in which a thing of iron and steam had been made to replace a donkey working at the pit pumps. But he remembered also that a donkey can be used not only as a source of power, but also as a means of locomotion. He reasoned:

Donkey as source of power	*is to*	steam-engine	*as*	donkey as a means of moving about	*is to*	——

In this way the first vague conception of the steam locomotive was born. The practical details were further eductions within the framework of this idea.

The same process is evident in the psychological and material constructions of the novelist. H. G. Wells's notion of a time machine, and all the entertainingly original experiences to which it gives rise, could be reached by a thought process available to anyone:

Travelling through space (with resulting entertainment)	*is to*	locomotive machine	*as*	travelling through time (with still greater entertainment)	*is to*	time machine.

By this application of relationships, therefore, it is possible for us to have ideas of things that we have never actually known, or of purely fanciful things which we can never hope to meet. Somewhere in the depths of primitive life the longing for love and protection must have evoked in many early thinkers the process, 'child' is to 'father' as 'father' is to —, and given rise to the conception of God. These things have been described here, for clarity, as if they take place explicitly and consciously, but the majority take place in fact at an unconscious or subconscious level.

A quarter of a century of brilliant conjecture and experiment enabled Spearman, his disciples, and his critics to construct a sound framework of knowledge behind the façade which Binet had ingeniously but hastily erected for the use of the workaday world. The gifts of a third great mind —an intellect with a naturalist's love of nature's intransigent detail—came forward to complete our knowledge.

Lewis Terman, professor of psychology in California, half the world away from the scene of the advances so far described, was the son of a farmer. Those who are curious to know how the germs of interest in so obscure a subject as psychology came to develop in a lad of the prairies may get a clue from the fact that when he was a boy a book-pedlar stayed a night at his father's farmstead. He sat in the ingle-nook, expounding the then fashionable doctrines of phrenology, and went on his way next morning, leaving a book on phrenology behind him. This itinerant vendor of culture did better business than he knew.

Impressed by the varieties and peculiar forms of mental defect, Terman devoted the first years of his professional life to an inquiry into the origin of these sad caricatures of the human type. The law divides defectives into three classes: idiots, who are "unable to guard themselves against common physical dangers"; imbeciles, who, although better than idiots, are "incapable of managing themselves and their affairs"; and the feeble-minded, who are yet a step higher, but who "require care, supervision, or control for their own good and that of others." The law, however, is inclined to be 'a hass' in things psychological, and its classification of defectives is scarcely an improvement on that of a bargee.

Lewis M. Terman
Photo Newton Studio, Palo Alto, California

Idiots usually show physical deformities and abnormalities too. The first statistical work showed that they averaged well below normal muscular strength and resistance to disease. Somehow there has been a general failure of the life force. They are speechless, take very little notice of anything, and, of course, are unable to understand the simplest instructions. Frequently they are helpless to the point of being unable to feed themselves. With this mental incapacity there is often an amazing insensitiveness to pain and slowness in reacting to it. The idiot who sits on a pin reminds us of the famous faith healer of Deal, in that he merely seems to "dislike what he fancies he feels." A room full of idiots is a place filled with inarticulate, cow-like noises, where individuals repeat meaningless movements or wander clumsily and aimlessly about, occasionally indulging in fits of half-human laughter or screaming.

Imbeciles are less physically awkward and helpless. They may possess a small vocabulary and imitate bits of new words heard, like children of two or three. They never acquire any conception of normal good behaviour, are mischievous, emotional, destructive, and sometimes sly—or so they appear. But these qualities may be an outcome of the difficulties to which the imbecile's low intelligence commits him. Like Caliban, he remains "a born devil, on whose nature nurture can never stick."

A typical feeble-minded is presented by Reggie ——, aged eighteen, the son of a labourer by a feeble-minded woman. He is physically heavy and over-developed, slow and awkward in movement. One of his many mannerisms consists in smiling sheepishly when spoken to, meanwhile scratching the back of his head continuously with his thumb. He can maintain a fairly sensible conversation as long as it is limited to the simplest topics. He cannot add five and five or tell you what day comes before Friday. He is imitative of things done in front of him, and is dangerously easy to lead by suggestion. He lies shamelessly, and steals ornamental nails and bits of leather from the shoe-shop where he works. When left alone with a visitor to the institution he is cunning enough to think he can enlist the visitor's influence in getting himself returned to work in the gardens, whence he was removed on account of gross indecency and exhibitionism.

There have been times when mental deficiency has been confused with insanity, although as early as the reign of Edward I a distinction was for the first time clearly drawn between the 'born fool,' or idiot, and the lunatic, or person who "hath had understanding, but by disease, grief, or other accident hath lost the use of his reason." One may be likened to an engine that is simply too weak, of too small a design, to cope with normal requirements; the other to a sufficiently powerful engine that has become deranged and mistimed.

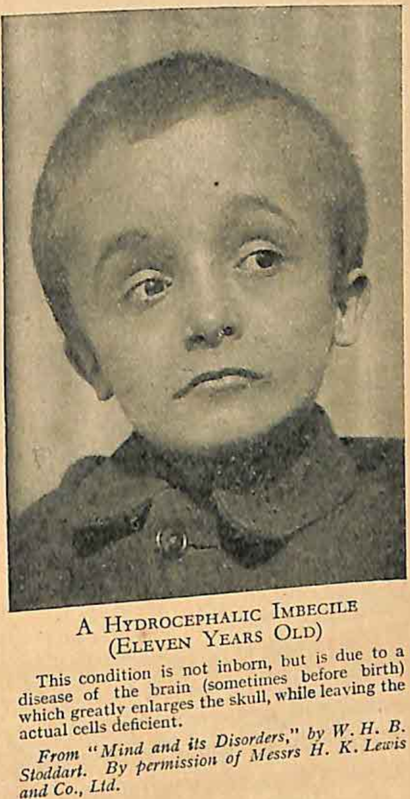
Terman's experiments showed that mental defectives do not stand as a class apart, a distinctive type, but that one may pass without a break through a transitional group of dull and moderately stupid people into the general type

A Typical Mongolian Imbecile Girl, aged Eleven

A Microcephalic Imbecile, at Twenty Years of Age

From "Mental Defect," by Lionel S. Penrose. By permission of Messrs Sidgwick and Jackson, Ltd.

of the population. Mental defect is, therefore, not an absolute state, but a purely relative condition. In a race of more highly developed beings we should all be classed as defectives, and require "care, supervision, or control" in the immensely more complex world in which such a race would live. Yet it is not entirely correct to say that the defectives of to-day would have been the normal type in more primitive ages. Many of them are definite biological abnormalities. Psychologists and medical men soon recognized as distinct from straightforward defectives two or three well-marked defective types, characterized by peculiar physical and mental stigmata.



A HYDROCEPHALIC IMBECILE (ELEVEN YEARS OLD)

This condition is not inborn, but is due to a disease of the brain (sometimes before birth) which greatly enlarges the skull, while leaving the actual cells deficient.

From "Mind and its Disorders," by W. H. B. Stoddart. By permission of Messrs H. K. Lewis and Co., Ltd.

A type of idiot with peculiarly stunted body-growth—the cretin—has long been singled out and known to be the product of deficient gland activity — the thyroid gland.

Another type, the microcephalic, is characterized by a very small skull—a head 'with no back to it.' These idiots are usually well-behaved and emotionally stable: they are just normal men with pigmy intelligences.

Concerning a third type, the Mongolian imbecile, there has been much interesting speculation from the racial point of view. These imbeciles have a distinctive physique: short, stubby hands; slanting Oriental eyes; smooth, thick, sallow skin; bullet heads; and flat noses. To complete the resemblance to the true racial Mongol of China they invariably squat down in the characteristic cross-legged fashion of Buddhas. Mongolian imbeciles are very delicate, have little nervous energy, and in winter almost go through a kind of hibernation. They are lovable as children, docile, cheerful, and very imitative. Dr Crookshank has shown that this type of imbecile is particularly common among the Bretons, the people of Central Europe, and wherever there is historical record of an intrusion of Mongolian blood. Are they therefore to be interpreted as throwbacks among nations with a remote Mongolian streak, just as other forms of defect are apparently atavisms to earlier European and negroid ancestry?

A CRETIN (GIRL AGED EIGHT)

Defective mental development as a result of gland-failure.

From "Mental Defect," by Lionel S. Penrose. By permission of Messrs Sidgwick and Jackson, Ltd.

The Californian psychologists amassed an unrivalled store of observations and measurements to clarify these issues. Terman, faced with all these rich qualitative variations of ability, naturally found Spearman's mathematical simplifications rather premature, and expressed his disfavour with "the dogmatic tone of the author, the finality with which he disposed of every one else, and his 100 per cent. faith in the verdict of his mathematical formulæ." For himself, he looked at the normal and the defective child, and decided that, as far as one could yet tell, intelligence was the power of thinking abstractly. Yet in the end these independent thinkers found themselves attaining to the same truth through the different approaches suggested by their own temperaments.

Meanwhile Terman made a notable discovery. He observed that normally a child of, say, seven with a mental age of six—*i.e.*, one year retarded—would be increasingly retarded as he grew up—*i.e.*, at fourteen he would have a mental age of about twelve—two years of retardation.

AN IMBECILE BOY (AGED FIVE)
(PITUITARY DYSTROPHY)

Defective intelligence caused by pituitary-gland failure, and associated with extreme obesity.

From "Mental Defect," by Lionel S. Penrose. By permission of Messrs Sidgwick and Jackson, Ltd.

Consequently, no true index of a child's intellectual promise is given simply by saying how many years he is retarded or advanced, and Terman sought for a better way of defining mental capacity. He hit upon the notion of the 'intelligence quotient,' or 'I.Q.,' a figure obtained from dividing the child's mental age by his actual age. A girl of ten with a mental age of eight would thus have an intelligence quotient (or 'mental ratio') of $\frac{8}{10}$ (always multiplied by 100, to give whole numbers—*i.e.*, 80 in this case). If her mental age had been thirteen and a half her I.Q. would have been $\frac{13\frac{1}{2} \times 100}{10}$ (*i.e.*, 135).

Terman's assistants now set out to measure the intelligence quotients of the same children at stated intervals, to discover how intelligence is affected by mental training, exercise, and food. The remarkable fact was then discovered that, in spite of differing home and school environments, the intelligence quotient of each child tends to remain a constant. A dullish child, with an intelligence quotient of, say, 91, measured at eight years of age, was found to have an I.Q. of 91 when measured again at twelve years of age. Similarly for average I.Q.'s of 100 or bright children with I.Q.'s of 130 or 140. Once a bright child always a bright child—which, of course, is very different from saying, "Once brilliant at school always of brilliant intellect."

All this may seem to run directly counter to a comfortable popular belief that precocious children fall behind in later years and that men of genius have started as dull children. How often does the worthy bishop or colonel at a school prize-giving attempt gallantly to hearten the losers by informing them that he himself (or even some more worthy person) was never very good at school! Of course, there are many forms of precocity that to the untrained eye successfully simulate intelligence, just as there are temperamental abnormalities which hide intelligence revealed only to the intelligence test.

The fact remains that most geniuses (of the more purely intellectual domains particularly) have shown outstanding intellectual precocity as children, just as mental defectives can be recognized as such from their earliest years, owing to the constancy of the I.Q. Macaulay at the age of three "read incessantly," and at the age of seven produced many stanzas of imaginative stuff in the style of this excerpt:

> Day set on Cambria's hills supreme
> And, Menai, on thy silver stream.
> The star of day had reached the West.
> Now in the main it sank to rest.
> Shone great Eleindyn's castle tall;
> Shone every battery; every hall.

Goethe at the age of seven wrote witty dialogue. At nine "he built an altar and developed a mystical religion of his own, in the hope of approaching God directly, and thus worshipping him without priestly intervention." Pascal, as a boy, had an overwhelming desire to learn algebra and geometry. His father, however, only consented to teach him as a reward when he should have learned Latin and Greek. Thereupon Pascal drew the diagrams which fascinated his youthful mind on the floor of his playroom. By the time his father had discovered this disobedience the boy had got as far as the thirty-second proposition of Euclid, without the help of a book and using a system of naming which was all his own. He had virtually rediscovered the propositions.

In support of the popular view it is frequently instanced that Darwin as a boy was a dunce, even a simpleton. But this inference is stupidly drawn from the bare fact that he rapidly forgot Greek verse and made mediocre progress in a classical education which he found intolerably dull. His masters' opinions are also coloured by their ire at having constantly to rebuke him for wasting his time with such disreputable pastimes as botany and geology.

Hearsay in psychological matters is all too readily accepted as a substitute for exact analysis. The latter has almost invariably shown that meteoric ups and downs in individual performances are not due to real changes in intelligence, but to changes of interest, temperament, health, and opportunity.

The constancy of the intelligence quotient was soon proven to be a simple natural law. Illness, malnutrition, and any disease affecting the whole constitution can alone cause intelligence to deviate from its natural rate of growth. (Experiments in Germany after the War showed that the severest malnutrition causes a barely perceptible alteration in the development of intelligence.)

Most surprising of all, it was found that the extent to which a person uses his brains makes no difference to his intelligence quotient. Children having a desultory schooling, or none at all—*e.g.*, gipsy and canal-boat children—have the same rate of growth as those enjoying (or should one say 'suffering'?) the most intensive education. Children from uncultured homes progress at the natural rate, as do those from homes where every possible stimulation is given to the intellect. To expect that the mind will develop unusual intelligence through handling difficult intellectual problems is apparently as erroneous as to suppose that a bank clerk must get rich because he handles a lot of money.

Both Binet and Terman had been led by problems of mental defect to study intelligence; it was the genius of Terman to perceive that a vast field for discovery lay open in the variations of intelligence among normal people. He invented the group test, which made possible the testing of hundreds of people at once, in place of the old individual testing. With this new tool he made surveys to determine the amount of high and low intelligence in the general population, to find the effect of various physical and home conditions, and to estimate the influence of intelligence on school progress.

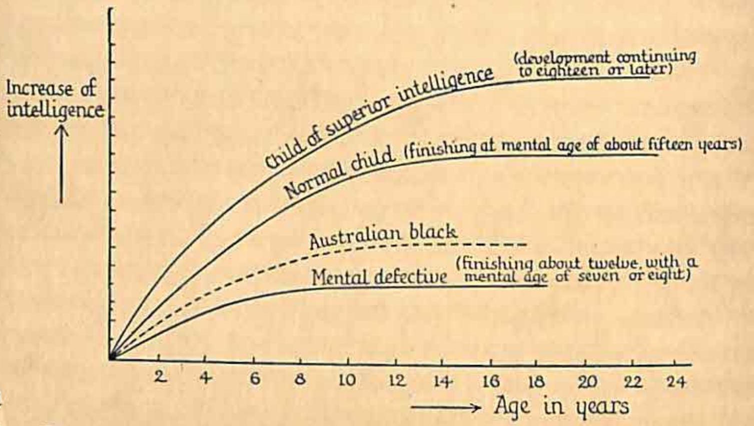
When America entered the Great War, Terman was one of the leading psychologists who saw the practical utility of the new science, and he determined to place it at the service of the nation.

Faced with a flood of raw recruits, the Army might have bungled the job, as conservative authorities often do, placing round pegs in square holes, and neglecting the latent military talent in this new civilian army. They might have wasted months sorting out future commissioned officers, N.C.O.'s, and men according to parade-ground estimates. Instead, the psychologists applied a group test, lasting barely an hour, to more than a million citizens, to effect this prodigious sorting. This gigantic experiment ranks as one of the great successes of applied science, for long experience showed that the selection of men for posts of higher and lower responsibility, and the elimination of the dangerously stupid, had been highly effective. Similar methods applied to generals and politicians may lead to staggering results in some future Utopian state.

This nation-wide sampling of mentality also solved many scientific problems. Among other things it confirmed a remarkable observation—made earlier, but scarcely believed—that a person's intelligence ceases to grow after his fourteenth year. Indeed, the average mental age of the American army turned out to be barely thirteen years. As the diagram below shows, the normal growth of intelligence is most rapid in the early years. It is greater between three and seven than between eight and thirteen. Between thirteen and fourteen it is very slight, and after fourteen it is negligible.

"How absurd," some reader may exclaim, "to assert that a man of forty has no more intelligence than a boy of fourteen!" Admittedly in knowledge, in wisdom, in all the tact and skill that comes of experience, the man of forty gives a more effective response. But place them both on entirely fresh ground, and the grasp and power of the boy's mind will be found equal to those of the man. The boy's powers may even be greater. Recent research definitely indicates that both the power to commit to memory and intelligence itself show a slight decline soon after the age of thirty, which, however, remains of negligible rate until a much greater age.

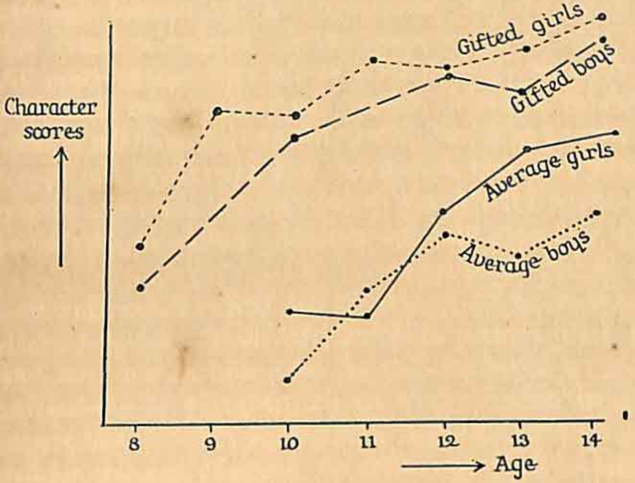
Great contributions to culture have been made by men of eighty and over, but these are seldom works giving an original view of life or providing solutions to old problems. Experimental psychology points unwaveringly to the conclusion that, if all the facts necessary to decide any question could be mustered, men of from twenty-five to thirty-five would draw more intelligent conclusions than older men, in whose hands, however, we leave the adjustment of vital matters in politics, law, and education.



Curves of Intelligence Growth, showing Different Rates and Different Ages of Cessation for Different Types

But can a man of thirty-five have in his possession the necessary knowledge which a man of sixty can summon up? Memory is sometimes a poor selector of experience. Samuel Johnson, at the age of fifty-seven, remarked, "It s a sad reflection but a true one, that I knew almost as nuch at eighteen as I do now." And how could he emember how much he had forgotten? The scientific lecision as to whether leadership should be in the hands f older or younger men must depend on the particular conditions of each occupation. Certainly there must be many situations in a rapidly changing world where 'experience' is a handicap, and where the powers of those between twenty-five and thirty-five would be more useful than the powers of those between forty-five and sixty-five.

If the intelligence quotient is practically constant and intelligence growth is unresponsive to training, are we to conclude that differences in intelligence, like differences in stature and eye-colour, are largely inborn?



THE RELATION OF CHARACTER TO INTELLIGENCE, AS SHOWN BY AVERAGES OF GIFTED AND NORMAL CHILDREN IN ACTUAL CHARACTER-TEST SITUATIONS

From Terman

As early as 1909 Burt, in England, mooted this possibility, and soon both his and Terman's results proved it to be a fact. The average intelligence of a number of children in a family tends to be about the same as the average of the parents. The children of a group of parents selected for superior intelligence invariably have a markedly higher average intelligence than the children of a group not thus selected. The teacher, therefore, can train children to apply intelligence wherever possible, but he cannot hope to increase it—for that he is dependent on the birth-rate among intelligent parents.

Psychologists have much to do with mental defectives, because the poor in mind are always with us—an ever-present educational problem. Only recently have psychologists been able to turn to a more inspiring subject: the psychology of highly talented children. Great Britain spends more on the 'education' of the mental defective than on that of the normal child. Professor Berry tells us that the cost of each idiot to the community runs into thousands of pounds. Some day perhaps we shall have the wisdom to pick out gifted children all over the country as we now pick out defectives, and give them the opportunities of special schools (more selected than our present grammar schools), thereby making the finest investment that the nation could make.

Before turning to genius in the flesh—future genius—Terman and others analysed the biographical material concerning a large number of men who in the past have made signal contributions to the progress of civilization. By comparing the childhood and adult remarks and accomplishments of these men with the remarks and accomplishments of living children and adults whose I.Q.'s have been measured, it has been possible to compute the I.Q.'s of the dead. An estimate is thus made of their I.Q.'s both in childhood and in later life. The agreement of the two figures is usually pretty good. Pitt the Younger appears to have had an I.Q. of 160, Voltaire 170, Coleridge 175, Bentham and Macaulay 180, Goethe 185, and Mill 190. Such high values are very rare, now as then. Terman set out to study prospective genius by taking the thousand brightest children in California—less than ½ per cent. of all the children tested. Their average I.Q. was comparable with that of men whom posterity has recognized as geniuses. Every possible scientific comparison was now made between this group and a thousand children of average I.Q. (100) selected at random.

Firstly, it was found that the bright children numbered among their near and remote relatives a far greater number of famous people. Exceptional ability is, therefore, partly a matter of inheritance. Secondly, these research-workers found an astonishing refutation of the general view that highly intelligent children are liable to be physically weakly, more nervous and unstable than the average. Precisely the opposite was discovered: they were above average height, weight, and muscular development; they were less subject to tantrums, nervous conditions, and petty delinquencies; they were good children to get on with, and showed powers of leadership among other children of their own age.

If insanity is more frequent among men of genius than among normal people, it is not always because of any greater constitutional instability, but because of the independent views of the genius and the acute misunderstandings and violent emotional strains which they provoke. Again, the intelligence of the young genius opens up to him wider fields of intellectual exercise, in which he is in danger of prodigally using up his nervous energy during the years of growth. Terman found that these highly talented children had considerably more hobbies and interests than the average child in which to expend themselves.

Finally, in considering the relation of insanity to genius we must not overlook society's attitude to the pursuits which interest genius. "What are you doing nowadays?" asks a business-man of an old college friend. "Writing poems," replies the poet. "Yes, yes, I know," interjects the former, testily, "but I mean what are you doing for a living?" Highly capable men of comfortable, stable temperament do not become geniuses, because they enter traditional occupations, business, the Army, the civil service, as a matter of course, in which their efforts are met with tangible rewards rather than *post-mortem* renown. A certain oddity of temperament, something akin to a neurotic compulsion, a flicker of insanity if you will, is necessary to turn a man of good ability from such a straightforward career against the whole force of social custom and family pressure. Consequently the child of exceptional intelligence may not become a genius, unless we extend the term 'genius' to cover outstanding performance in traditional occupations equally with creativeness in untouched fields of literary, artistic, and scientific creativeness. "Where is the madness with which you should be inoculated?" demanded Nietzsche of the crowd. But high ability is of immense service to the community, whether it is inoculated with madness or used in established channels.[1]

And how is the promise of this Californian youth being fulfilled? The follow-up investigation shows that up to late adolescence the lead, both in intelligence and in attainments, is being maintained. The adult careers will be followed with considerable interest by all who have studied this social experiment.

Another problem investigated was the extent to which variations in intelligence affect ordinary work, particularly school performance. The trend of statistical results favours the view that children with a mental age one year ahead of their actual age would be two years ahead in school attainment. Intelligence invests itself in this direction at 100 per cent. interest. But the democratic ideal and the necessity of keeping a class together cause us to slow down the natural pace of the bright child and put pressure on the dullard. This revelation of what is happening in the ordinary classes caused fifty American cities to start special classes for their very brightest children, selected by intelligence tests.

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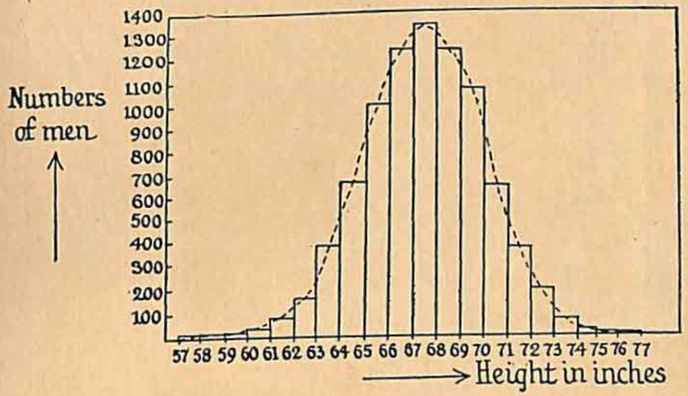
[1] The director of a large business in Oxford Street, London, of nation-wide fame, was found to have an I.Q. well over 150—a figure comparable with that of many geniuses of literature and science.

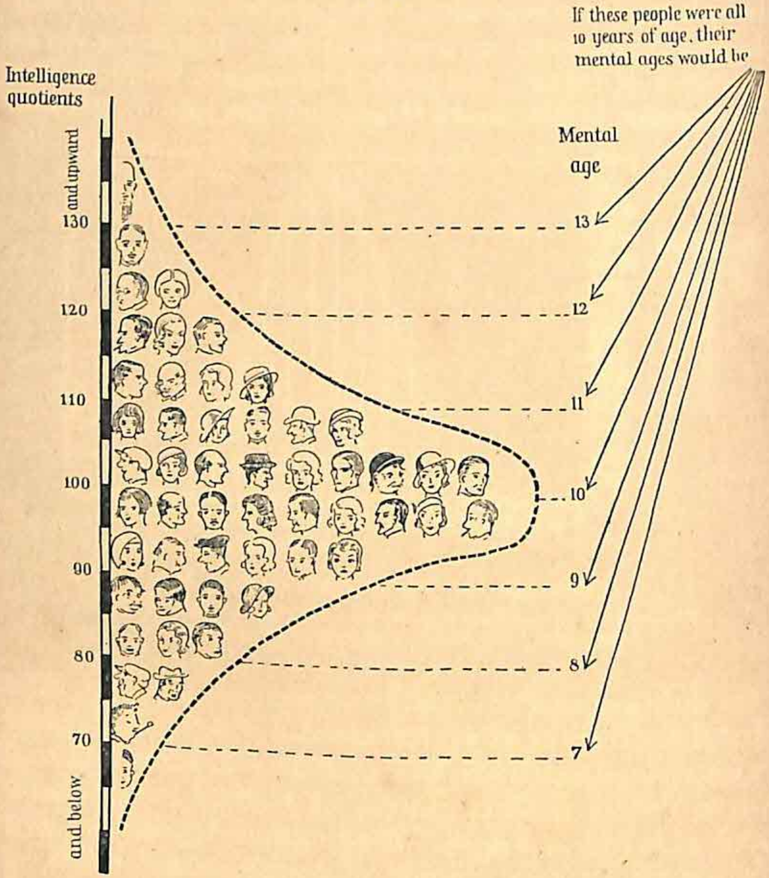
The range of intelligence quotients in the general population is astonishingly wide, as the preliminary experiments mentioned at the beginning of the previous chapter indicated. Indexes from 10 to 200 have been met. It will one day be a matter of concern for every Government to know how intelligence is distributed throughout the nation, and how that distribution alters under various social measures. The first thing that the group test revealed was that intelligence is distributed in an even fashion, in the well-known 'normal curve' which is always found for physical measurements such as height or weight. If we measure statures in Great Britain we find the majority of people around 5 feet 7½ inches (males), a percentage at 5 feet 4 inches and 5 feet 11 inches, and a still smaller percentage at 5 feet and 6 feet 3 inches—*i.e.*, the numbers fall equally above and below the average. In the above curve the statures are given along the bottom, and the height of the curve at any point represents the number of people having that particular stature. The curve on the next page, precisely similar in



Histogram for the Heights of 8585 Men

The height of each rectangle indicates the number of men whose height is at that figure. Distribution curve (dotted line) superimposed.

general outline, is that found for the distribution of intelligence quotients in the population as a whole. One-

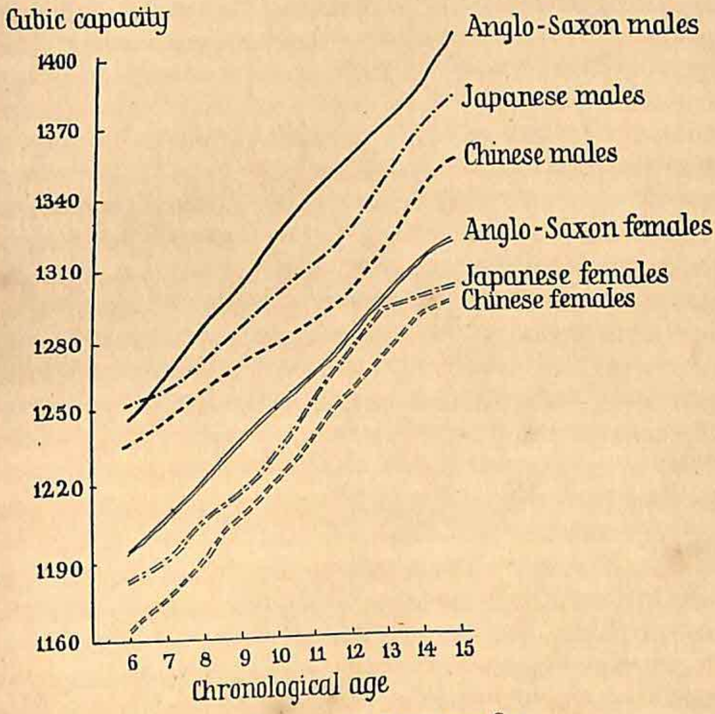


The Distribution of Intelligence

The length of each row represents the number of people, out of fifty, who would be at that level. (The half faces at the top and bottom each represent half a person—*i.e.*, 1 per cent. of the population.)

half of the population—the 'backbone of the nation'—falls between I.Q.'s 85 and 115.

In Great Britain the line for mental defect is fixed at 70, since persons below this level have been found to require "care, supervision, or control." As the distribution curve shows, this line cuts off less than 2 per cent. of the population. But the line is in many senses arbitrary, and is



BRAIN GROWTH IN RACE AND SEX

There are significant differences in the average intelligence of various races. The three races shown here, however, achieve practically the same average in intelligence tests, as also do the different sexes. Yet differences of brain capacity, determining factors outside intelligence but equally important, evidently exist.

From "Temperament and Race," by S. D. Porteus and M. Babcock

allowed to vary in practice according to the accommodation available for mental defectives. In America it is allowed to cut off considerably more than in Great Britain. Better facilities in America have enabled the standard of mental defect to be raised to include many people requiring institutional care who in Great Britain would be allowed to get along as best they could in the "big, buzzing confusion" of the outer world. Imbeciles, as fixed by the rough definition of the law, are found to have I.Q.'s below 50, a value now accepted as an exact demarcation.

At an early stage in intelligence-test surveys it was noticed that children from good-class homes tended on an average to have slightly higher intelligence than those from poorer homes. At first this was interpreted to mean that better environment was productive of better intelligence, but in the light of the findings just discussed it is seen that the explanation is unlikely. Rather must one suppose that the intelligence is higher because the intelligence of the parent who obtains a better job is, on the average, higher. A detailed survey of intelligence in the elementary-school children of the Isle of Wight showed that there was a rough correspondence between the complexity of the job held by the father and the intelligence of the children. Presumably there is a rough correspondence between intelligence and social status.

To determine the average intelligence of people in various occupations is of more than theoretical interest, however, for it is going to make possible a science of vocational guidance and enable us to direct children leaving school to the callings for which their abilities best suit them. The occupational intelligence averages given at p. 293 are abstracted from a recent survey by the present writer in which thousands of adults took part.

Naturally there is a big difference of I.Q. between the brainy man and the dull plodder in each occupation, but the latter is not necessarily a misfit, for strength of character can often make a little intelligence go a long way. Some of the outstanding variants from their occupational averages met by the writer during years of testing include: a medical man with an intelligence equal to the average for shop-assistants ; an unemployed hairdresser with the brain of a good professional man (but an unsuitable and unstable disposition) ; a well-to-do business-man with an intelligence equal to the average for van-boys (I.Q., 84) ; and a merchant-service seaman with the mental capacity found only among distinguished university professors. In the last-named instance a dislike of sedentary life and a complete absence of ambition had given this happy-go-lucky fellow an existence full of interest, even though it might be in a social sense regarded as a wasted life. (Not that his 'superiors' had not profited greatly on more than one occasion from employing so intelligent a subordinate.)

Nature shuffles the cards of heredity and deals out a very mixed hand to most of us. Of all her misdeals, that in which great ambition and drive are wedded to small ability is the most tragic, for it is a combination that frequently leads to crime. Fortunately, not all the components of personality are inherited. Roughly one may say that although our abilities are largely inborn, temperament and character are largely products of environment, of home, school, and the world. To the foundations of character and temperament we must next turn.

Looking back at a ripe age on the outcome of the scientific study of capacity, such as we have considered in these chapters, Terman has declared prophetically his belief,

> that public vocational testing bureaux . . . will be operated for the benefit of adults of all ages and both sexes . . . that matrimonial clinics will become common, and that couples in large numbers will submit themselves to extensive batteries of ability, personality, interest, and compatibility tests before deciding to embark together . . . that mental testing is destined to exert a profound influence on economic theory, industrial methods, politics, and the administration of law.

In countries in which the economic blizzard has not discouraged people from introducing new machinery—social as well as mechanical—these prophetic visions have already been partially realized. In watching the fine, spreading tree of beneficent social applications it behoves us not to forget the little seed of arduous and scarcely appreciated pure research from which it grew.

Spearman's picture of the sub-structure of mind—of the central *g* and innumerable *s*'*s*—has been increasingly verified by the outcome of the extensive practical applications which Terman and others have engineered. That structure has been shown to hold for the minds of mice as well as for those of men. It is true even of that farmyard imbecile—the common hen.

At the present time research-workers in the field of abilities are hot on the trail of the special aptitudes, discovering their variety, mapping their boundaries, and investigating their mode of development in response to training. These are the factors which decide a person's skill in countless restricted fields—from threading a needle to imitating a provincial accent. We may see some of the tests used, in a later chapter containing accounts of vocational guidance. It is enough if we point out that since these abilities are so numerous, every single individual must, by sheer mathematical probability, lead the rest of the world in one of them. Every one, therefore, can consider himself an actual or potential genius at some one thing. Thus is democracy justified through equality in diversity.

CHAPTER IV

PASSION AND IMPULSE: THE ROOTS OF HUMAN ACTION IN ANIMAL INSTINCTS

THE seventeenth century, respecting the philosopher Descartes and not entirely rid of medieval theological obsessions, believed animals to be complicated physico-chemical machines, devoid of the immortal soul unique to mankind. The nineteenth century, led by Darwin, tried to grasp the essential oneness of human and animal life, but humoured its older prejudices to the extent of maintaining that animals are governed by instinct, human beings by reason. Even that barrier has gone down before the science of the twentieth century, which has found instances of indubitable reasoning in animals and discovered instinct embedded in the mind of man.

Indeed, the recognition of instinct heralded the beginning of psychology as a practical science. For a thing is not a science until one can predict by its aid. And where in the whirl of social life, in the waywardness and complexity of individual hopes and fears, whims and prejudices, intrigues and impulses, can the psychologist point to order, causality, predictability? To be able to measure a person's intelligence, for example, does not tell us whether it will be applied to business, to science, to criminal ends, to solving cross-word puzzles or divining the winner of the Derby. It is evident that intelligence is only a tool which is used by powers quite different from itself. To measure the width of the tool is only to determine one aspect of what it will do.

In man the threads of motive are so entangled that we may despair of finding order, but when we turn to the animal, and, still better, to the insect world, we come at once upon certain ways of acting and feeling which follow each other with the predictability of music upon a familiar gramophone record.

Without ever having seen a nest made, a bird, at a certain time of the year, seems to experience an impulse to attend to and pick up wisps of straw. She then proceeds to make, as from some idea long treasured in mind, a particular pattern of nest.

Beavers, who can scarcely have any prevision of the glorious bathing-pool which they are about to make, gnaw at the trunks of trees with such skilful regard for gravity that the falling trunks interlock across the path of the stream, forming the necessary dam. They have attended no college of engineering; they may even have been separated from their kind since birth; yet they proceed with the subsequent processes of adding sticks, stones, and mud, to crown an engineering feat which ranks with the cleverest structures of human thought.

Tiny insects can present still more striking examples of unlearned, skilful, but mechanically executed sequences of action. Fabre, the great French naturalist, observed for the first time the detailed life of the solitary wasp, which, hatched from a grub and never having seen its parents, recognizes certain kinds of caterpillar as the right food for its own larvæ. It stings the caterpillar, unerringly on a certain nerve centre, thereby paralysing without killing it. This inert but living piece of meat, preserved so ingeniously that canning is unnecessary, is then sealed up in the nest with the wasp's egg, so that the grub, hatching out the following season, finds a store of fresh food thoughtfully placed at its disposal. One is tempted to explain these happenings in human terms; to speak of 'reasoning' and 'foresight'; but closer attention to the evidence would show that to be wrong. Nothing but the inveterate egocentricity of our minds could lead us to such an illusion. Does the spider foresee the catching of flies as he designs his web? Does he even see as a whole the pattern of the web which he is making? Even those master minds of the insect world, the bees and ants, with their complex social classes, their cities, their domesticated animals and slaves, can give only a hollow imitation of intelligence as we know it. They are, as it were, wound up to perform certain tricks, and if anything unusual turns up they make such ludicrous blunders that their claim to reasoning is at once exposed as a sham.

The death's head moth creeps into the bees' hives, attracted by the honey. When the worker bees approach the uncouth monster to sting her to death she emits, by an accident of nature or by her own lucky discovery, a high-pitched note very similar to that of the queen bee. Thereupon one of those mechanical responses is set in motion. The evidence of their eyes is set at naught: the bees make obeisance as to the queen and withdraw.

Ants, who attend their grubs with amazing skill and apparent foresight, yet handle different grubs, obviously requiring different treatment, in exactly the same fashion, so that many of them die. They will fight to the death with foreign ants from a different nest, but if the foreigners are first sprayed with the scent of the home nest they are unsuspectingly welcomed in, whereas members of the home nest, sprayed with an unusual scent, are at once slaughtered.

Many insects will starve to death in the midst of plenty if the food happens to be represented by a species of caterpillar or grub slightly different from that which they are set to recognize.

Fabre observed that a solitary wasp, which had caught a cricket and intended to seal it up with its own egg in the nest, first dropped the cricket on the threshold, and entered the nest for a final survey before pushing in the cricket and closing up the entrance. Fabre, wishing to see what the wasp would do, removed the prey a number of inches from the doorway. Emerging, the wasp discovered its loss, but quickly espied the lost property and dragged it to the nest. There it dropped the cricket, and again entered to inspect the nest, as if according to some unalterable regulations, although it had made a final inspection only a few seconds before. Again Fabre removed the cricket, and the pantomime went on, repeating itself forty to fifty times without any sign of intelligent adaptation on the part of the wasp. In this game between insect and mammal, however, the insect's patience more than made up for its lack of intelligence, for Fabre was at length forced to desist. Others have persisted longer, and shown that in time a wasp will change its reaction. Nevertheless, we gain the impression that the life of the insect is governed by red tape more absolute than any that irks human beings, and all the more deadly because it is part of the insect's own constitution.

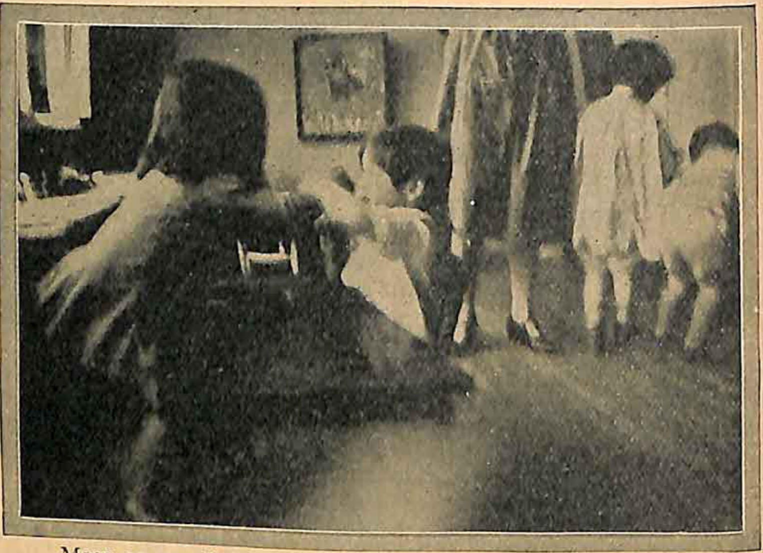
Animal instincts, contrasted with those of insects, show a greater plasticity. In times of scarcity many animals will perceive that a slightly different kind of prey or plant can be used as food. Most animals and birds will rear successfully the young of another species. There are no absolutely stereotyped ways of gaining any of the instinctive desires : just a general way of acting seems indicated by the inborn urges. A fleeing fox will try numerous variations on the simple theme of running away as a means of escape.

As the price of this elasticity the animals are born with their instincts relatively imperfect. The insect goes through the actions necessary to his livelihood with professional skill and polish from the day that he is born : the animal has to go through a series of clumsy rehearsals or even serve a short apprenticeship to his parents. The small child wondered how chickens knew the size of egg-cups when they had never seen them. As many a disgruntled customer knows, chickens are sometimes wildly inaccurate in their estimates. Our astonishment that animals are born with complex instincts is soon moderated by our discovery that these instincts are much less finished than they might be.

Naturally, the difference between animal and insect instinct is only relative. Fabre's solitary wasp has been shown to bungle some of his early operations. He requires a little practice before he stings the caterpillar unerringly. And after many repetitions he will learn to take his prey straight to the cupboard. An ant that has followed the time-honoured path to the nest will go to its nest another way after it has once fallen into a pool of vinegar placed in the path. Conversely, some animal instincts are stupidly unvaried. A young plover, with adaptive colouring, will sometimes 'freeze' at the sight of danger against a conspicuously contrasting background. A dog will turn round and round, "treading down the prairie grass," on a Turkish carpet, where all these efforts are quite unnecessary to make him a bed.

But how can all this throw light on the emotional roots of human life? It was the English psychologist McDougall who first showed convincingly that the great behaviour patterns which are so easily discernible in the animal world also underlie all human actions. 'All' is no exaggeration. Like the higher animals, we are born with a few big instinctive drives, forming the warp and woof of our nervous system. These cause us to pay attention spontaneously to certain things, to feel certain strong desires and emotions in regard to them, and to set about acting in a particular manner. But the manner in which we shall strive for the goals that attract us is less precisely defined than with animals, just as animal instincts are less stereotyped than those of insects.

Human beings are possessed, for example, of a sex instinct, which is none the less inborn because it develops late, but the manner in which they shall strive for the consummation of this biological need is far more varied and interesting than in the ape or the lower mammal. Still less is the human honeymoon prescribed in such detail as is the nuptial flight of the bee.



MOST OF THE INSTINCTS CAN BE SEEN OPERATING PRACTICALLY UNMODIFIED IN THE NURSERY

An angry child attacking forthwith the child who has frustrated her.

From "The Social and Emotional Development of the Pre-School Child," by K. M. B. Bridges. By permission of Messrs Kegan Paul, Trench, Trübner and Co., Ltd.

A new-born infant is already constitutionally set to feel that sudden loud sounds and the sensation of falling are dangerous. To these, and at first to nothing else, he reacts by screaming or by huddling himself up. Later he may crawl or run away. As he grows the fear instinct may attach itself to other things, and also express itself in other ways. (Another inborn reaction is 'freezing,' which is felt as 'being rooted to the spot.')

The object and origin of these patterns in our nervous system are plain. Countless generations of struggle have evolved such ways of feeling and acting as being the best means of preserving the individual and the race in face of danger, scarcity, and competition.

The Parental or Protective Instinct can be detected in Very Young Children

The infant with the beret is comforting the little girl (centre), who is showing signs of distress after being roughly kissed by the little boy on the right (who is enjoying the joke with his 'men' friends).

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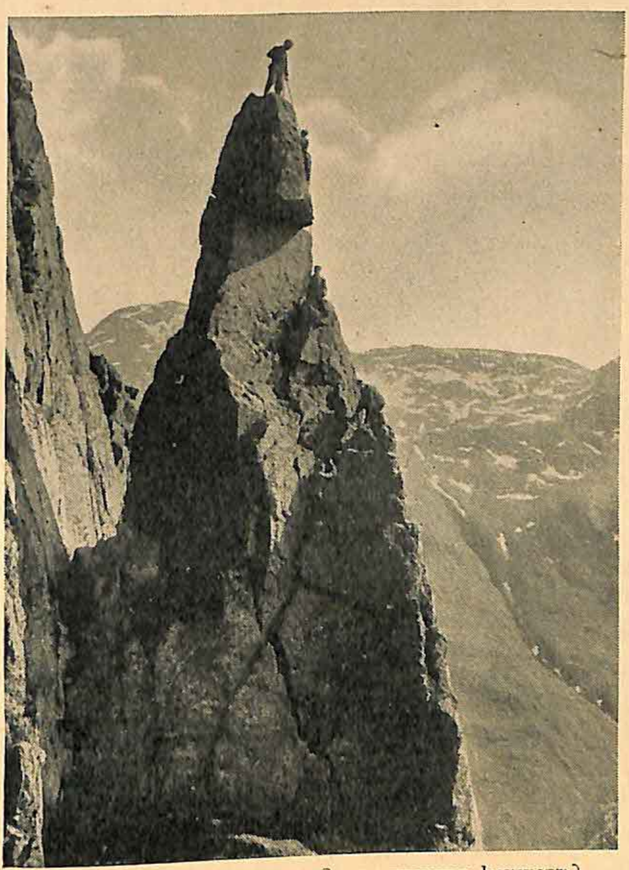
By a careful study of our emotional life and of human behaviour under primitive and special conditions, McDougall concluded that *Homo sapiens* and the higher mammals are possessed of some fourteen distinct instinctive drives—*i.e.*, inborn, unlearned ways of feeling and acting, which can nevertheless be modified by education to meet civilized needs.

Principal Instincts in Mammals

Instinct	Provoking Situation (Stimulus)	Specific Emotion	Action dictated by Impulse
Parental	Any young and helpless creature, any cry of distress	Tender emotion of protectiveness, pity	To protect, rescue, and cherish
Sex	Sexual preparedness in a person of the opposite sex	Lust, sexual excitement	Courting, caressing, mating
Food-seeking	Internal situation (hunger)	Hunting excitement (in carnivora), restlessness	Chasing, wandering restlessly, searching for food
Fear or escape	Large, strange, rapidly moving objects, violent sounds, etc.	Fear	Flight or 'freezing'
Combat	Obstruction to the free expression or satisfaction of any other instinct	Rage	Attacking, destroying, obliterating obstruction
Constructiveness	Need of home and shelter	Feeling too elusive to have been given a name ('Creativeness'?)	Building nest, burrow, house, etc., making things
Curiosity	Any new and strange object or situation	Curiosity, feeling of mystery	Careful exploration, sniffing, inquiring movements
Repugnance	Noxious things: excrement, dead bodies	Disgust, nausea	Avoiding, spitting out, etc.
Acquisitiveness	(Ill-defined)	Rapacity, miserliness	Collecting, gathering, maintaining ownership, hoarding
Appeal (reciprocal to parental instinct)	Distress, damage, isolation	Helplessness, insecurity, despair	Crying, calling out, weeping
Gregariousness (herd instinct)	(*a*) Separation from the herd	Loneliness, nostalgia	Efforts to get back into midst of one's fellows
	(*b*) Display of emotion by other members of the herd	Primitive passive sympathy (contagion of whatever emotion is felt by one's fellows)	Acting as one with the rest of the herd
Self-assertion (or display)	Hint of approval or deference from others	Elation, feeling of masterfulness, pride, positive self-feeling	Self-display, leadership, competitiveness
Self-submission	Disapproval exhibited by group or leader, powerfulness in others	Humility, self-subjection, negative self-feeling	Deference, worshipful behaviour, retreating into background
Laughter	Incongruous or even painful situations	Amusement, careless relaxation	Laughter

Through the veneer of civilized intentions it is often difficult to perceive the fundamental grain of our instinctive constitution, although most people with a little frank self-analysis can discern the primitive instinctive drive beyond any of their actions. We have been taught new ways of



A MANIFESTATION OF THE SELF-ASSERTIVE INSTINCT?

Mastery and the attainment of eminence are the direct satisfiers of this primitive instinct, so important in civilization.

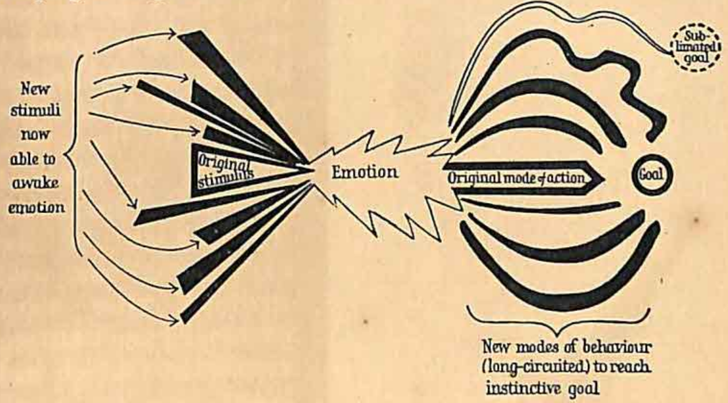
Photo G. P. Abraham, Keswick

ABSENCE OF THE GREGARIOUS INSTINCT OR A CONFLICT OF SELF-ASSERTION AND SELF-SUBMISSION BEFORE A LARGE GROUP?

A child who wanted to play alone.

From "The Social and Emotional Development of the Pre-School Child," by K. M. B. Bridges. By permission of Messrs Kegan Paul, Trench, Trübner and Co., Ltd.

gaining the old ends, ways not socially objectionable; we are stimulated by many novel settings in place of the old original exciting situation; occasionally we have even learned to be satisfied with goals slightly different from the original biological one, as when a childless woman keeps pet dogs in lieu of a child; but we remain, nevertheless, creatures drawing our life interests from instincts and behaving in predictable emotional patterns. For instance, the protective instinct of a woman may be set in motion without there being present any child in distress, but simply a piece of paper with some black smudges on it—a newspaper account picturing the distress of children in a slum area. And the action urged by the arousal of the instinct may be equally distinct from the primitive one: a woman may take up a pen and write a cheque for a children's charity or join a campaign for birth-control. Intelligence gives new eyes to the instinct and suggests new ways of satisfying it; but the emotion remains the same.


New stimuli now able to awake emotion
Original stimulus
Emotion
Original mode of action
Goal
Sub-limated goal
New modes of behaviour (long-circuited) to reach instinctive goal

Modification of Instinct by Experience

The diagram shows changes on the behaviour side and changes in the situations that release the impulse, but no change in the emotion.

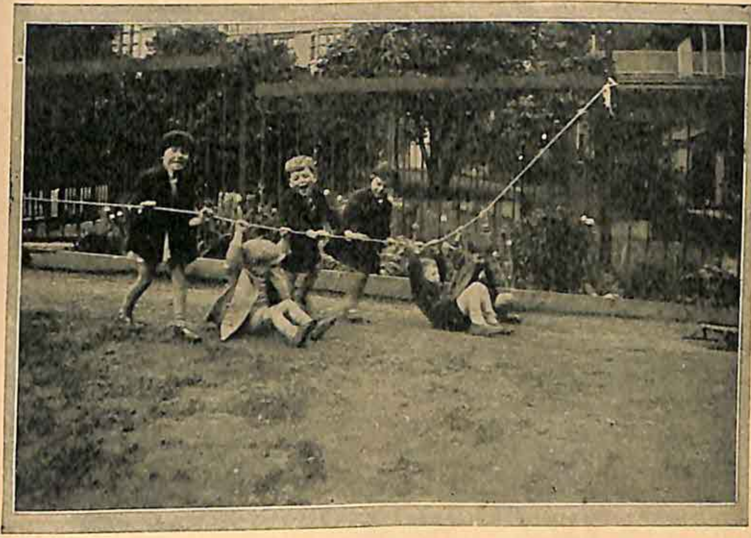
It is an interesting illustration of the part played by idiosyncrasies of personality in the growth of even such an impersonal study as science that the man who brought to light this basic instinctive structure of the mind was one whose strong emotional drives were ill-contained by the cloistral walls of a laboratory. Many a time, after a day cooped up in his London laboratory, McDougall would spend the night striding over the downs, enjoying the spacious freedom and the primitive savours of the night. And one wild morning, after some prolonged and exacting experiments which had lasted into the small hours, he experienced an irresistible impulse, upon which he "caught the newspaper train to Cornwall to see the storm breaking upon the cliffs."

WILLIAM McDOUGALL, F.R.S.

McDougall's insistence on the biological roots of psychology has ensured for the new science a firm foundation.

Photo C. H. Stoelting and Co.

The same dynamic nature which enabled him to appreciate so clearly the primitive basis of human nature also prevented him from degenerating placidly and respectably into an academic theorist. In 1899 he seized an opportunity to join an expedition to Borneo, and spent exciting months studying at first hand the mentality of the wildest head-hunters. In addition to gathering many new facts about little-understood primitive customs, totemism, and taboos, he was able to clarify still further, by countless observations, his general theory of the instincts. So that, seven years later, standing once more before washed and polished university audiences, he found himself "making the sweeping assertion that the energy displayed in every human activity might in principle be traced back to some inborn disposition or instinct."



THE INBORN TENDENCY TO 'PLAY' IS NATURE'S MEANS OF EXERCISING ALL THE INSTINCTS TO THE DEGREE OF APTNESS REQUIRED IN ADULT LIFE

Observe the operation of the instincts of laughter, self-assertion, appeal, and gregariousness.
From "The Social and Emotional Development of the Pre-School Child," by K. M. B. Bridges. By permission of Messrs Kegan Paul, Trench, Trübner and Co., Ltd.

Although this relating of human life to the more mechanical instincts of animals at once made human actions and feelings more predictable and understandable, McDougall, curiously enough, became the arch-opponent of mechanistic views of life.

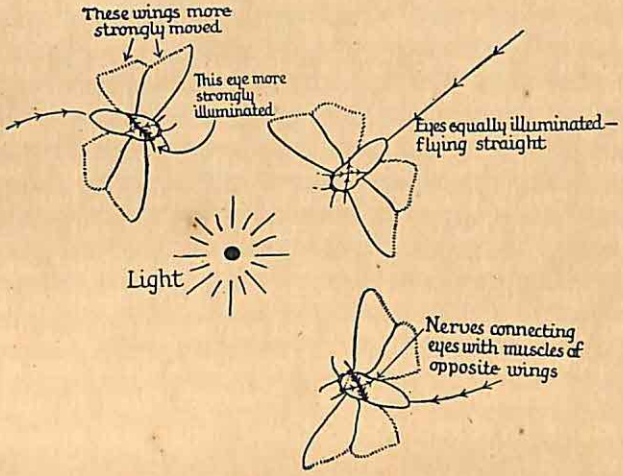
Before going on to see what McDougall and others made out of the instinctive theory in regard to problems of personality we must digress, to face the facts brought forward by the mechanists.

The most stereotyped instincts—those of insects—are surprisingly reminiscent of the action of some such mechanical contrivance as a musical box. A particular button is pressed and a particular tune begins to unfold itself. Stimulate the machine in another way and another appropriate response is set in motion. Why cannot animals be considered as complicated physico-chemical machines? Perhaps even the human mind is only a particularly complex chemical machine following the immutable laws of molecular action?

Unfortunately for them, the scientists who asserted this attractively simple viewpoint could always be tripped up by reason of the endless slight variations in response which even the most hide-bound insect makes if conditions change slightly while it is performing its instinctive *répertoire*.

So the mechanists unearthed still more simple and unvarying ways of behaving. Chief among these is what is known as a 'tropism'—an urge which impels a creature to approach or remove itself from certain standard conditions. The moth inevitably approaches the gleam of the candle. It is, say the mechanists, just like a machine in which the light-caused nerve current in each eye is led over to the wing muscles of the opposite side, so that when the left eye is getting most light the right wings will work more vigorously. Consequently the moth will always be redirected towards the flame. Machines have, indeed, been constructed which will behave in this way and follow a pocket torch around the room.

Loeb, one of the most thoroughgoing mechanists and a fine experimenter, showed that animals with phototropisms—*i.e.*, tropisms making them approach or recede from brightness—were, in fact, not behaving as if they had a rational intention to approach or avoid the light, but were simply machines responding to one-sided light intensities. For if he adjusted two lights so that the light fell equally on the two eyes the creature would move straight forward, missing both of them, whereas any inequality would pull it relentlessly into the brighter flame.


These wings more strongly moved
This eye more strongly illuminated
Eyes equally illuminated—flying straight
Light
Nerves connecting eyes with muscles of opposite wings

SUGGESTED MECHANISM OF LIGHT TROPISM IN THE MOTH

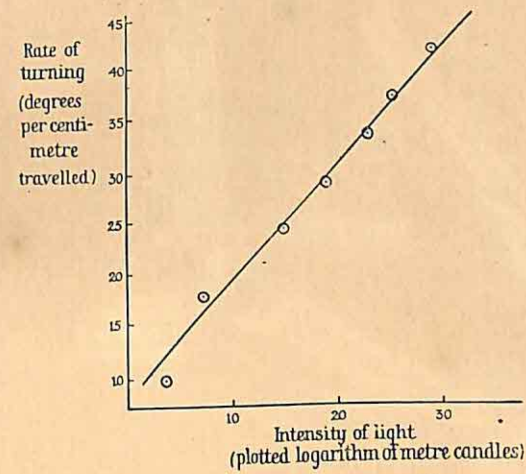
What then of creatures which sometimes approach light and sometimes avoid it? The grubs of a certain insect hatch out in spring on the lower branches and trunk of a tree. At once they seem to know that succulent buds are to be found on the tips of the branches, for they crawl out to the twigs and begin to eat. When they have had their fill they move back again. Loeb showed that this was not a purposive searching for buds, but simply a light tropism: by moving towards light they necessarily arrive at the tips of the twigs. Why then, asked his critics, do they move back? Loeb placed the creatures in a glass tube with a light at one end, and showed that when they were hungry they would move towards light (even though food were at the dark end), and that when they were satisfied they would become negatively phototropic and move towards the dark. Their action was determined by their chemical and physical condition, just as a balloon will rise or fall according to the percentage of gas in it.

In certain instances it has even been possible to work out precise mathematical equations showing how the creature will behave. Slugs with one eye-stalk covered will move in circles in a uniformly illuminated field. The radius of the circles varies in a definite way with the intensity of the light, so that the path of the slug's morning walk can be predicted even before he leaves home.

There have also been discovered chemical and electrical tropisms. Certain small pond creatures (slipper animalcules) have an invariable penchant for migrating from neutral to slightly acid water, and any object—*e.g.*, a bubble of CO_2—dispensing dilute acid becomes a speak-easy which they are powerless to avoid. Shrimps seem to feel the direction of an electric current, and congregate around the positive pole.

The general nature of these tropisms is indistinguishable from that of the tropisms of the vegetable world, which, for example, compel roots to turn downward and towards water, and make stems turn upward and towards the light, whatever the direction of the planted seed.

Higher animals do not show any such simplified general behaviour, but even in their case certain isolated muscles and organs exist which make an inevitable response to a given stimulus. This response we call 'reflex action.' Reflex action occurs when we blink at the threat of a sudden blow, sneeze, wriggle in response to tickling, throw forward the hands in falling, or kick when tapped under the knee-cap (the well-known knee-jerk reflex of the doctor's consulting-room). The main characteristics of all these responses are that they are started by a particular stimulus, take place without our willing them and generally without our being able to control them, and, like the instincts of insects, are perfect from the day of our birth. "Velocity," said the hard-pressed examinee, "is what a man puts a hot plate down with." And simple, unpremeditated speed is the particular virtue of most reflexes.



PREDICTABILITY OF TURNING MOVEMENT OF A SLUG

After W. J. Crozier, "The Study of Living Organisms"

Now the nerve mechanism behind the reflexes has been found to be quite simple. In most cases the brain is not involved at all. A single nerve thread carries an impulse from the stimulated spot into the spinal cord, alongside the other nerves that carry awareness of sensation. There the nerve-ending meets a motor nerve which carries impulses outward, and it is 'reflected,' as it were, down this nerve fibre to the muscles that have to be moved. Hence the term 'reflex.'

Here is the perfect penny-in-the-slot machine, which seems to present the beginning of a mechanical explanation of mind. Pavlov, a famous Russian scientist, was intrigued by a vision of the whole nervous system—the whole mind—as a collection of reflexes built up in an ingenious hierarchy of control and counter-control. With painstaking industry and an unexampled scientific imagination he set out to discover just what a reflex can do and what it can't. Where reflexes are concerned an animal is as good as a man, and Pavlov chose to work on our friend the dog, who possesses, as we do, the convenient reflex of salivating at the sight or smell of food—convenient because the extent to which the reflex is at work can be measured

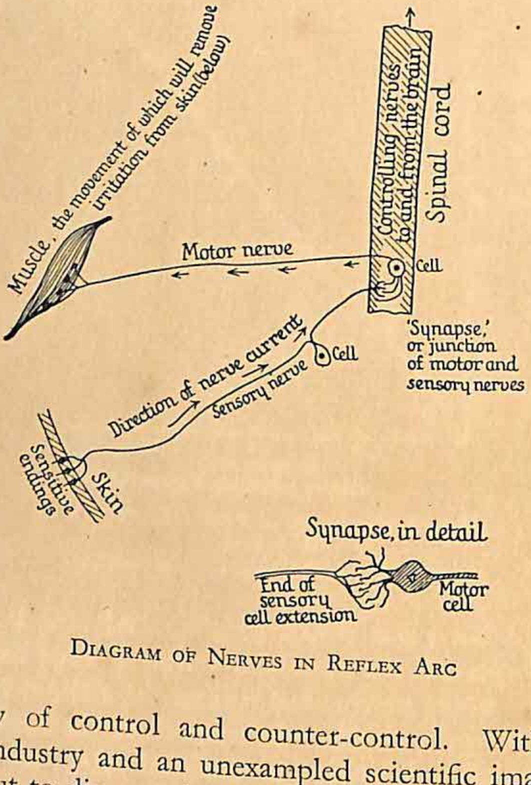
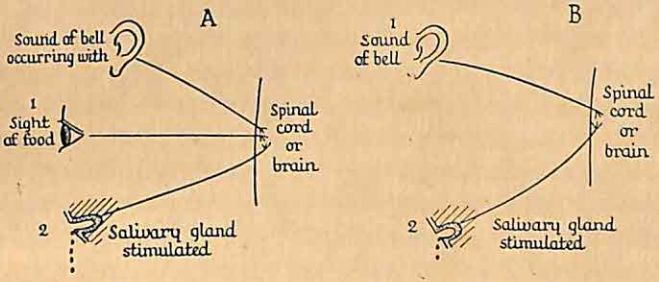

Muscle, the movement of which will remove irritation from skin (below)
Controlling nerves to and from the brain
Spinal cord
Motor nerve
Cell
'Synapse,' or junction of motor and sensory nerves
Direction of nerve current
Sensory nerve
Cell
Sensitive endings
Skin
Synapse, in detail
End of sensory cell extension
Motor cell

Diagram of Nerves in Reflex Arc

by the number of drops of saliva given out by the gland per second.

Pavlov now found that if a bell is rung at the time of presenting the food the dogs will come in time to salivate at the sound of the bell without any food being present. This he called 'conditioning' a reflex to a new stimulus. Practically any reflex can be conditioned to practically any stimulus.

An explanation of what happens has been attempted by McDougall, in terms of a theory of 'drainage of nervous energy.' According to this, if one part of the nervous system is active it tends to attract to itself any nervous energy liberated in outlying parts. So that if I am already concentrating on one thing and some new stimulation occurs, the new nervous energy tends to express itself by the channels already active, just as the water of a cloudburst finds its way into some stream-bed already in use. Thus, if a man is intent on pulling the trigger of a gun at a word of command he may do so at a sharp blow by mistake. And it has been shown experimentally that the output of a man doing work under test conditions goes up, at least for a time, if some additional sensory stimulation or irritation is brought to bear upon him.


A
Sound of bell occurring with
1
Sight of food
Spinal cord or brain
2
Salivary gland stimulated
B
1
Sound of bell
Spinal cord or brain
2
Salivary gland stimulated

THE DEVELOPMENT OF A CONDITIONED REFLEX
A, conditioning of native reflex 1–2; *B*, conditioned reflex.

Now between the end of one long-drawn-out nerve cell and the beginning of the next there appears to be no direct connexion. The little roots at the end of one nerve interlace with the branches of its neighbour, but there is no more connexion of their inner substance than there is between two people shaking hands. At these junctions, the 'synapses,' as they are called, there is considerable resistance to the nervous currents which run along the compound nerve fibre, but when a passage has been forced several times the resistance drops enormously. The path has been worn smooth, and drainage can occur in that particular direction much more easily. On the first occasion that a bell is rung while a dog is feeding the nervous energy finds its way with some difficulty through virgin synapses to the nerves that happen to be active—the salivary-gland nerves, etc. With repetition that pathway becomes deeply graven into the nervous connexions, and thereafter the sound alone is sufficient to cause salivation, without the necessity of any food being present.

Through a long and fruitful life Pavlov has pursued the plan of his exacting experiments from consequence to consequence. Neither the recurring rigours of the Russian winter, nor famine, nor the uproar of revolution have upset his quiet concentration. The principle of conditioning has brought much light into obscure problems of human and animal learning.

The time intervals between the two stimulations have been shown to be very significant. Rats running a maze can be taught to avoid wrong turnings by being given a slight electric shock. If a buzzer is sounded at the same time they become conditioned to it so that henceforth they can be taught by means of sound only. But in this and other instances there is an optimum interval in learning between sound and shock. If they are separated by more than a second, conditioning is very slow, and if the shock precedes the buzzer, by no matter how little, it is almost impossible to condition the original reflex avoidance reaction; all of which is interpretable on the hypothesis of drainage.

Many of the likes and dislikes, fears and prejudices, which constitute a vague and uncomprehended emotional undertow to our conscious intentions are essentially reactions conditioned by accidental incidents in our earlier lives. Consider first the manifest dread which some domestic animals show for fire, in spite of its beneficent warmth. Here we have a reflex avoidance, produced by earlier contact in the following way:

Stimulus: Sight of flames.
Occurring with
Stimulus: Pain of burning, which has the inborn
Reflex Reaction: Movements of avoidance, leading to the
Conditioned Reflex Stimulus: Sight of flames. *Reaction:* Withdrawal.

By this means a person may unconsciously conceive a dislike for another just because that other has been repeatedly met in company with a disliked acquaintance or situation. How often the psychoanalyst finds that people with an unaccountable aversion for cats have (unknown to their conscious memories) been severely scratched when playing with kittens in childhood! Watson, an independent-minded American investigator who has sought to bring Pavlov's method and technique into closer contact with problems of everyday life, has experimentally studied the conditioning of emotion in early childhood.

An infant, Albert, eleven months old, had for some time been playing with rabbits, mice, and rats on the happiest terms. Watson wished to see whether a rat could be made the conditioned stimulus of a fear reaction, simply by being presented to the child at the same time that a sudden, loud sound was made—which is the natural stimulus for the fear reflex.

We may glance at the results as they are recorded in Watson's notebook :

> White rat, which he had played with for weeks, was suddenly taken from the basket [usual routine] and presented to Albert. He began to reach for the rat with left hand. Just as his hand touched the animal the [iron] bar was struck [with a hammer] immediately behind his head. The infant jumped violently and fell forward, burying his face in the mattress. He did not cry, however.

After half a dozen repetitions of this rat-plus-bang experiment and the lapse of about a week the rat was presented alone.

> The instant the rat was shown the baby began to cry. Almost immediately he turned sharply to the left, fell over, raised himself on all fours, and began to crawl away so rapidly that he was caught with difficulty before he reached the edge of the mattress.

It is interesting that in this instance the conditioning extended to all furry things in any way resembling a rat. The infant now shrank back from a dog, and whimpered and fretted if a rabbit or even a fur coat were placed near him.

Lest the sentimental should think that the psychologist is a veritable bogy-man of little children, one must remind the reader of the beneficent objects of these experiments, although far more daring experiments must be made before ultimate problems are solved. One valuable finding is Pavlov's demonstration that reflexes can be 'deconditioned' by repeating the conditioned stimulus at short intervals without reinforcement by the original natural stimulus. The writer's infant son, when ten months old, would cry inconsolably if anyone sneezed in his immediate neighbourhood. This was traced to an occasion when his mother had sneezed violently while carrying him. The sensation of falling is, as we have seen, one of the primitive stimuli for the fear reaction, and the sound of sneezing, by association with it, had become a conditioned stimulus producing the crying of fear. With careful attention to technique the stimulus of sneezing was presented to the baby by his father (with the help of a little pepper) at five-second intervals, the baby being firmly seated on the floor. After two days, complete deconditioning was produced, and the baby afterwards regarded a sneeze with the utmost contempt.

It would be interesting to know how far our æsthetic tastes, our preferences in colour, texture, and design, are the products of early conditioning, but certainly many of our emotional reactions which have no rational basis are of this kind. Novelists have employed this connexion with telling effect. Thomas Hardy, in *Desperate Remedies*, relates how Cytherea Graye, after witnessing from the Town Hall her father's tragic accident, was brought home, semi-conscious with shock:

> . . . her eyes caught sight of the south-western sky, and, without heeding, saw white sunlight slanting in shaft-like lines from a rift in a slaty cloud . . . Ever after that time any mental agony brought less vividly to Cytherea's mind the scene from the Town Hall windows than sunlight slanting in shaft-like lines.[1]

A soldier who had reacted to terrifying happenings in a dugout found years afterwards that he could not travel in a tube train without a recurrence of his previous terrified behaviour, although the association was quite unconscious. A scent that has once been worn by a beloved person may call up with considerable intensity the original attitude, and the perfume of new-mown hay may reinstate in December the reactions appropriate to June. The threads of conditioning are woven everywhere in the finished pattern of our mental life.

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[1] Cited by Professor Bartlett in *Remembering*.

The beautiful simplicity of this principle of the conditioned reflex has unfortunately tempted many into believing that it explains everything. In particular, the schools of psychology known as 'behaviourist' and 'reflexologist' (which are trying to build up a science based entirely on the way people behave, without asking them for introspections on their conscious life) have spoken of reflexes where there is as yet no evidence that the typical reflex nerve structure exists. We have spoken of fear as a reflex, but it certainly does not arise from the action of a single nerve; neither are the mechanisms confined to the spinal cord, for, as we have seen in the first chapter, many nerves in the brain are involved. Is any emotion to be described as a reflex? Only if we extend the meaning of the word 'reflex' to include massive reactions of the general reflex pattern but involving many nerve tracts. Watson would say that the emotion of fear, for example, is a reflex of which the natural stimulus is a sudden loud sound and the natural response an internal jerk of the viscera and muscles (plus gland secretion), which are felt by us as 'that sinking feeling' which we call fear.

This at once raises the question whether emotions can be regarded as anything but the feeling we have of changes in heart, lungs, stomach, and intestines—a thorny question, which we had better postpone. Suffice it that McDougall and other psychologists would at once reply that the emotion is only part of the unrolling of a complex instinct, which cannot be explained as an ingenious mechanism of reflex piled on reflex, because the animal strives for its instinctive goals now this way, now that, varying infinitely its methods, as no machine has ever been known to do.

Fortunately we are not bound to hoist the flag either of the mechanistic or of the non-mechanistic school. Both views have led to valuable contributions, and possibly some psychologists, like other human beings, are spurred to more energetic efforts by the feeling of belonging to one of two contending camps. But at present McDougall's description best fits the facts. According to that, we inherit in our nervous systems tendencies to attend to particular objects, to feel in certain ways about them, and to strive in a fairly varied fashion to do something about them. Ways of perceiving and of acting can be modified by civilized education, but our entire energy—our entire interest in life—springs from these instinctive patterns. Some day perhaps the mechanists will show how these undoubted facts can be explained as due to the operation of a very wonderful machine, built up of nervous reflexes.

CHAPTER V

FREUD EXPLORES THE BORDERLAND OF MADNESS

In distant Borneo McDougall was striving to get a true plan of the human mind through studying primitive man and animals. Meanwhile, in gay pre-War Vienna, city of careless joys and bitter tragedies, Freud was struggling with the problem of human minds that had gone out of gear. And these two men, medical man and scientist, delving in such diverse fields, were destined to arrive at substantially the same conception of the foundation of mind.

Into Freud's consulting-room came the lame, the halt, and the blind of the mental world. Between the pit of insanity and the level tableland of normal lives lies a strange and varied country of mental abnormality which we describe by the term 'neurotic.' Neurotics are far more numerous than the definitely insane, and the majority appear to live fairly normal lives as far as the casual observer can perceive. But a large proportion of them live in constant danger of straying over the brink of the pit and becoming mentally lost.

The forms of neurosis are legion, but psychologists have long learned to recognize a few large categories, such as hysteria, neurasthenia, obsessional fears, compulsive impulses, and all manner of mild delusional symptoms which pass without any sharp dividing line into the prejudices, fads, and obstinacies of so-called 'normal' people—*i.e.*, people outside the walls of mental hospitals.

By 'hysteria' the psychologist understands essentially a condition in which a person complains of various physical ailments without there being any true physical foundation for them (or, as it is more usually described, without a doctor being able to discover any physical cause). These may be pains, cramp, headaches, paralysis, and even blindness or deafness. With this there goes a pretty typical mental attitude. The man (for hysteria is almost as frequent in men as in women) is capricious and unstable, adopts theatrical attitudes, and indulges in violent displays of feeling (hysterical fits) which one feels to be exaggerated or artificial. There is a morbidly great desire for attention and affection. Such a person is often addicted to concocting stories, presented as true incidents, which are damaging to other people or show himself as a remarkable and much-admired person.

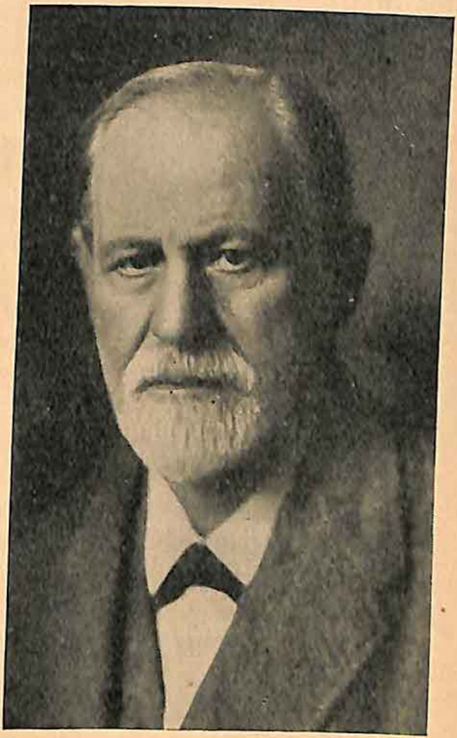
The neurasthenic is a very different, and in some ways a much sorrier, parody of normality. He complains of lack of energy, is restless and depressed, cannot sleep normally, is a prey to anxiety, and finds it hard to make up his mind about the simplest issues—*e.g.*, as to whether or not he shall wear a hat.

Obsessions and compulsions comprise a class of neurotic phenomena which have immense variety of form. A man may be normal in all other respects, and yet have an obsessive dread of any closed space, so that he cannot be induced to enter the cabin of a small boat, or work in a photographic dark room, or travel by tube. If he succeeds, by immense efforts of rational will, in forcing himself to do any of these things it is only to become the victim of complete nervous exhaustion and breakdown. Or an otherwise very companionable man may have a compulsive urge to stab anyone with whom he is talking, so that he is afraid to pick up any pointed instrument. Another may suffer, like Lady Macbeth, from a hand-washing compulsion, which impels him to go through the business of washing his hands a couple of dozen times per day. These actions can scarcely be said to afford the neurotic any special pleasure, but he nevertheless feels bound to carry them out with religious scrupulosity. 'Normal' people who are inconvenienced by the neurotic's behaviour may get some insight into and sympathy for his mentality by recalling their own tendencies to tap lamp-posts when walking by them, to tread on every other paving-stone, or to arrange clothes in a definite ritualistic fashion before going to bed. There are such tiny neuroses in the most normal minds. The writer cherishes memories of the medical superintendent of a certain asylum who would on no account step on the cracks between paving-stones, and whose subordinates lived in the hope of one day watching his deportment on a crazy-paving pathway to be constructed in the grounds.

Previous to Freud there had been little attempt to understand these disturbances in terms of psychological causes. The hysteric was considered a particularly obstinate malingerer; the neurasthenic 'just needed a good tonic'; the obsessional was a man who wouldn't make the effort of will necessary to pull himself together; while the insane were the victims of brain tumours, nerve degeneracy, poisonous toxins from some hidden source of inflammation, or even a special 'germ of insanity.'

Two great French specialists in mental disease, Charcot and his pupil Janet, of Paris, had achieved some success towards the end of the last century in treating neurotics by hypnotism and suggestion. Their success was like a faint beam of light which makes the surrounding darkness all the more intense. It was Charcot who heartened Freud in his new line of research at a time when medical authority laughed at any but materialistic explanations of the neuroses. The very facts were little known or appreciated. At the Medical Society of Vienna roars of laughter greeted Freud's assertion that male hysteric could be seen in Paris—for was not hysteria, as it derivation from the Greek word for 'womb' indicates, a complaint of women?

Freud, whose original mind was cramped by the routine of a medical practice, had wished to be a scientist, and had, indeed, spent some years in research on brain physiology and anatomy. He had narrowly missed being the inventor of cocaine as a local anæsthetic. But his funds failed, and he turned to practise as a neurologist and nerve specialist. Thus began his association with Joseph Breuer, family physician and mental specialist. Together the young iconoclast and the more plodding older man would discuss the tangled problems which they faced from day to day. Then in 1882 Breuer told Freud of a remarkable cure which he had just effected with a hysterical girl. In a hypnotized condition the patient had recalled and relived a very distressing incident which had been completely lost to her waking life. From this moment the hysterical symptoms—paralysis, speech disturbance, and somnambulism—



Professor Sigmund Freud

Photo E.N.A.

vanished, and the emotional condition became normal. Freud at once experimented on similar lines, and in 1895 he and Breuer published the theory that hysteria was due to an intensely emotional idea or memory which, because of its unpleasant character, had been rejected by consciousness, split off, and buried in the unconscious region of the mind. Here it nevertheless continued in subterranean activity, producing alarming symptoms int consciousness.

It was at this point that Freud, feeling himself to be on the brink of great discoveries, went to study the more varied material at Paris. But he found himself unable to assent to the views of the older authorities, Janet and Charcot. Charcot showed how a man with a paralysed arm (but with no discoverable organic cause) would, when hypnotized, move the arm when told to do so. After one or two sittings he could be made to move the arm freely, and had complete control of it on returning from the hypnotic state. Freud responded to this miracle by saying that it was insufficient; that it was only the cure of a particular symptom, not of the disease. He then showed that in many such cases the buried complex (as he called the unpleasant, emotionally charged idea) would sooner or later seek some new outlet, and the trouble would begin all over again.

He rapidly followed this up by proving that a buried complex was the root of many other neuroses too—*e.g.*, compulsions and obsessions. One of the pioneers of abnormal psychology in England, Dr Rivers, presents a case, now classical, of a medical officer who, during the War, became oppressed with an intolerable fear of dugouts and enclosed spaces, although shells and bullets troubled him but little. By immense effort of will he fought down this irrational fear, but soon he became ill, afflicted with acute insomnia, headaches, and stammering. His condition grew worse, and he was sent to hospital. By careful inquiry Rivers, to whom the man had been sent for treatment, eventually succeeded in bringing to light a memory, forgotten since childhood, in which the patient, as a very small child, had been accidentally shut in a dark, narrow passage with a fiercely growling dog. The particular nature of the banished idea at once explained the form of the obsession, and its reconsideration in adult consciousness immediately destroyed its evil influence, leaving the patient completely cured of his neurosis.

The theoretical propositions to which Freud's insight and accumulating experience eventually led him were briefly these:

1. That a neurosis arises when strongly emotional ideas and memories, unpleasantly toned and not fitting in with the system of ideas constituting one's self-respect, become split off from consciousness and forgotten. Such repressed memories we call 'complexes.'

2. This forgetting, although not consciously undertaken, is none the less deliberate. It is the last resort of the mind in attempting to end an intolerable and chronic mental conflict. As such it must be considered as a natural biological reaction, akin to the process by which the body isolates within a wall of protective tissue some infection centre which it cannot master. To this live burial Freud gave the name 'repression,' which must not be confused with 'suppression'—*i.e.*, deliberate, willed rejection of an impulse in the interests of self-control.

3. Apart from the thoughts and desires of which we are conscious there exists for each of us a buried, unconscious mind, the existence of which can only be demonstrated by attending to the more obscure and irrational forms of thought and behaviour. Indeed, normal people

are but little affected by visitations from this ghostly realm of outlawed ideas—complexes—and we have to turn to the neurotic for clear and striking evidence of an unknown hand at work behind the scenes of consciousness.

Freud refined these conceptions with the advent of each fresh case-study in his consulting-room—his ideas were never static—but few guessed at that time on what a long and original voyage of thought he had set out. In 1894, ten years after their famous joint investigation, he was compelled to part company with Breuer, whose halting steps would not tolerate such imaginative l ps, and who was, moreover, alienated by the sexual empl which Freud now began to place on the neuroses.

At this point, too, the young Viennese psychiatrist came to regard hypnotism as a rather spectacular and relatively inessential tool for unearthing complexes. He introduced for general use the psychoanalytic method of 'free association,' in which the patient is simply induced to reveal the way in which trains of thought run through his mind when he is not hampered by the necessity of appearing logical or of directing his thought to any particular end. He also came to the standpoint that the unconscious is peopled not only by ostracized ideas, but also by those inborn impulses, especially impulses of our childhood years, for which civilized society offers no welcome. A neurosis is the struggle of these wishes, desires, and fears to gain adequate outward expression. It is essentially a wish fulfilment.

If this be true it follows that most of us use only a fraction of our mental energy. For in repression we cut off certain springs from any useful expression, and then waste still more energy in the chronic civil war necessary to keep them down. Modern educators have drawn from this theory a conclusion of immense hope. According to their interpretation, thwarted and deformed personalities, full of envy, prejudice, and malice, and lacking in energy and enthusiasm, which so encumber civilized life, would never develop if we brought up children in such an atmosphere of understanding that no repressions were brought about. The undesirable impulses would be sublimated—diverted slightly from their original objects—and integrated into the main stream of the personality, instead of being brusquely repressed. Psychological research in education (when people realize its necessity) will doubtless show what a long way we can go with methods of prevention and early detection, in place of our present more costly procedure of psychoanalysing the finished neurotic.

Unfortunately an unbiased investigation of Freud's new theories was rendered quite impossible, both in popular and in professional circles, because of his insistence on the predominantly sexual nature of the unconscious. That a scientific theory should fall foul of a rooted popular convention of reticence may appear the purest historical accident. But in this case it happened to be a veritable proof of the soundness of the theory, for it was Freud's argument that the unconscious is constituted by precisely those impulses which come under the taboos fashionable in society at the time.

The realm of the unconscious was discovered through studying the neurotic, but its influence was next detected in normal minds. As a rule we scarcely think it necessary to seek true causes for our frequent slips of memory, our commission of unintended actions, and our manifold illusions of seeing things as they are not. They are all just 'accidental.' We were tired or absent-minded, distracted or overcome with excitement—that is considered sufficient explanation.

Yet errors occur frequently in the absence of such conditions, and, in any case, why does the error take one form rather than another? Freud tells us of a famous

German chemist whose marriage never took place because he forgot the hour of the ceremony and took his usual walk to the laboratory instead of going to the church. Here there was later revealed a strong unconscious resistance to the wedding, which had caused the forgetting of an idea that must have been both recently and frequently in the conscious mind.

In an instance known to the writer, a woman was the recipient of unwelcome afternoon visits from rather objectionable neighbours, who invariably stayed to tea. On one occasion for some reason they were unable to do so, and, greatly to this woman's relief, announced their departure. She made, or thought she made, the conventional remark, "I'm *so* sorry you have to go." Her actual remark, however, was, "I'm *so* glad you have to go." But it was not until she saw the horrified expression on the face of her daughter and the outraged countenances of her visitors that she realized that anything amiss had been said. Even printers' devils may prove to be more than creatures of chance. Freud cites the instance of a socialist German newspaper innocently speaking of "the Clown Prince," and that of a none too popular general referred to as "this battle-scared veteran." Next day an apology was inserted for the latter error. It read: "The words, of course, should have been 'this bottle-scarred veteran!'"

In the light of this unconscious motivation we may understand why marriages at which the bridegroom forgets the ring are likely more frequently than others to end in the divorce court, and why in unhappy marriages the wife may often make the mistake of writing her maiden name in books or documents. An old lady once asked the writer why of late she had constantly misdated her letters, writing 'July' and 'August' instead of 'December.' It came out in conversation shortly afterwards that she much dreaded the winter, and longed for the return of summer. Probably, too, there was a symbolical harking back to the summer of her own lifetime.

A young man, telephoning his *fiancée*, found, to his astonishment, that he was speaking to the *fiancée* of a great friend. He could not consciously recollect her telephone number, although he remembered seeing his friend use it a few weeks earlier. Both the remembering of the number and the act of using it were here unconscious. When the writer faced him with the interpretation he confessed to a profound attraction for his friend's *fiancée*, which, being scarcely able to contemplate it, he had forced himself to ignore. The ways of the unconscious are often surprisingly devious and apparently ingenious. The writer remembers staying at a students' hostel at which a young woman student who held his regard was also staying. It was the custom on retiring at night to chalk the number of one's room on the soles of one's shoes, to facilitate the boot-boy's task of returning them. One morning the writer's shoes were nowhere to be found. When they were eventually recovered it was seen that he had unwittingly written on them the number of the young woman student's room. This could scarcely be put down to tiredness.

An unconscious wish—a wish generally running contrary to one's ' better ' self—is the chief cause of the notoriously common forgetting of irksome or embarrassing appointments, or of the losing of objects which one apparently values. A woman lost a favourite jumper, and searched unavailingly in the usual places. It turned out that she had worn the garment frequently the year before when going out with a man who had paid much attention to her, but who now went about with another woman. A short time afterwards his affections returned to their original object; whereupon, although she no longer had particular need of the jumper, she was moved to search for and find it among some old clothes. On two occasions the writer has had a cheque returned to him with a note to the effect that, although correct in all other respects, it lacked a signature. Both these omissions, which surprised the writer not a little, were occasions when he strongly felt the payment to be an unjust extortion.

Every one, once his eyes have been opened to the thing, will be able to muster a great variety of such incidents from his own experience. But he must be careful in proceeding to the deduction of motives therefrom, for the unconscious is essentially poor in discrimination, and liable to act on the flimsiest resemblances or chance associations, and is satisfied with destroying the symbol when it really wants to destroy the thing. A student friend of the writer was unable for many months to find a certain valuable scientific book. When it was at length found by accident the student remembered that the last occasion he had seen it was when he had been balancing the book on his knee throughout a very embarrassing interview with his dean, an occasion which he would fain have forgotten. In the middle of a lecture the writer once found his exposition completely held up by his inability to remember the name of the painter of the *Mona Lisa*, a name entirely familiar and connected to other ideas by plentiful associations. When it eventually strolled unannounced into consciousness, some hours later, it was in company with another name—Ludovici. This name had certain unpleasant associations from a heated argument of the preceding evening, in which the writer had been reproached for an apostate from the convictions of his youth. The resemblance to Leonardo da Vinci was sufficient to cause a blundering unconscious to banish both.

The theory of repression has sometimes been popularly stated by saying that we tend to forget experiences that are unpleasant. But to this the reader will rightly object that some of the most painful experiences of his life are precisely those most vividly remembered. The staunch Freudian will reply with undue obviousness that no one can remember how much he has forgotten. More earnest psychologists have subjected the matter to experiment, and found that our memories are almost exactly fifty-fifty pleasant and unpleasant, and that there is hardly any tendency to forget unpleasant more rapidly than pleasant experiences. It becomes clear that what we forget are not physically painful, sad, or unpleasant incidents, but embarrassing and distressing ideas which conflict with our self-regarding sentiments.

Again, the unfortunate person who pleads that he has forgotten an important appointment is now told that he had a wish to forget it, that he intended to forget, that, in fact, he is really as culpable as if he deliberately refrained from appearing. This also is a misunderstanding. Grammatically we may say 'I' wished this or did that, but psychologically, according to Freud's evidence, there are two entities, a conscious ego and a dissociated set of impulses constituting an unconscious mind. The former can no more be held responsible for the acts of the latter than the Government of a nation can be called to account for the depredations of an anarchist. There are bound to be times when ideas from the underworld trick the rightful officials, and enjoy for a brief day the capacity for self-expression. This point raises legal difficulties which are not mere theoretical issues, for the defence of dual personality has on more than one occasion been seriously put forward.

Thus Freud's conception of the unconscious proved in the end to be of the utmost value in understanding the normal as well as the neurotic person.

CHAPTER VI

DREAMS AND LAUGHTER: CHILDREN OF THE UNCONSCIOUS

RESPECTABLE physicians were just beginning to be impressed by Freud's success in treating the neuroses when, to the surprise and dismay of his followers, he made one of those unexpected mental leaps, and announced that the next clue lay in the study of dreams—the flimsiest of mental *débris*, with which no serious scientist would allow himself to be concerned.

Dreams have been the serious stock-in-trade of seers and prophets; they have even influenced the practical plans of such practical men as generals, kings, statesmen, and tipsters; but scientists have just ignored them as things tainted with superstition and fitted only for charlatans and fortune-tellers at a bazaar. The 'common-sense' attitude has been to regard them as the schoolboy evidently regarded parables when he described them as "heavenly stories with no earthly meaning."

Freud was struck by the resemblance of dreams to neurotic thought, and, rubbing the magic lamp of his imagination, he opened through them another gateway to the treasure cave of the unconscious. We must notice, first of all, that the dreams of children, and of adult folk under primitive conditions, are simpler than our own. The hungry child dreams of a kitchen pantry as big as St Paul's, stocked with jam tarts; or, for all too short a time, he finds himself surrounded by the playthings of his heart's desire. The savage awakens from an exultant dream of having killed his enemy, to the disquieting fact of his enemy's continued existence. Famished explorers of polar regions tell us of dreams, recurring night after night, in which they ate of roast pork and fat bacon from tables groaning under the weight of food. And the sun-tortured traveller in a thirsty desert dreams of sparkling fountains in shady gardens. In all of these the dream is plainly a wish fulfilment.

The dreams of adults in civilized life, however, appear to be just meaningless rubbish cast up by the tide of sleep. Freud argued that we should find them to be disguised wish fulfilments, and he searched for a means of penetrating the disguise. Now the child, and the adult in a simple environment, are thwarted simply by the facts of the external world—the locked pantry door or the endless desert. But the civilized adult finds his desires thwarted also, by forces within himself—ideas of propriety and self-respect. That is to say that many of his desires have been thrust by repressing forces into the unconscious, and dare not face his conscious thought. Hence the disguise which the desires have to wear when they emerge in dreams.

Here Freud introduced the notion of the censor, standing on guard at the gateway between conscious and unconscious mind, speeding unwanted thoughts on their way to the limbo of the unconscious and barring the exiles' return. Occasionally in the daytime the censor may be caught off his guard, and there occurs one of those momentary slips which we have recently discussed. But in the dead of night deep sleep dulls the discernment even of the censor, and the forbidden urges may venture abroad, like ghosts, arrayed in strange disguises. If the disguise gets too thin the censor may suddenly perceive the deception : the alarm is sounded, and they are herded back to their proper domain. Always they must vanish at the first dawning of waking consciousness. So quietly and effectively is this withdrawal carried out that it is almost impossible to give a true account of the contents of a dream. There is an uncanny rapidity about the forgetting of dreams which has made such forgetting proverbial. Here forgetting is not any ordinary fading out, but a true repression—the reassertion of a repression grown slack during sleep. Moreover, this repression and alteration of memories goes on for some hours after waking, so that the dream related at the breakfast-table is very different from that written down immediately on awaking (entirely apart from that conscious elaboration which all good stories undergo).

The material of the dream as it is remembered immediately on awaking Freud called the 'manifest content.' The true ideas and wishes of which it is a disguise he called the 'latent content.' And what are the changes that have been wrought in the latent content to disguise it and which we must reverse to get back to the true ideas?

Firstly, Freud showed that the material of the manifest content is taken from events of the dream day or, at least, from recent incidents. Secondly, these events have not their ordinary meaning: they are symbols for more fundamental things. Generally, too, there is dramatization: conflicting ideas are represented each by a distinct person in the dream. Even the dreamer's own ego may be represented by another person. Freud recognized two other processes in the 'dream work,' as he called the process of transforming latent into manifest content: condensation, which is a process of economy whereby one item in the dream is made to do justice to and take the place of several ideas in the latent content—as G. K. Chesterton is said on one occasion to have given up his seat in a tram to three ladies—and displacement, a process whereby the most important ideas in the latent content receive quite negligible representation in the dream, or *vice versa*. As part of this mechanism of displacement—of misplaced emphasis—we recognize allusion in which something is referred to by an insignificant part of itself, by a far-fetched similarity, hint, or metaphor, or even by the direct opposite of itself.

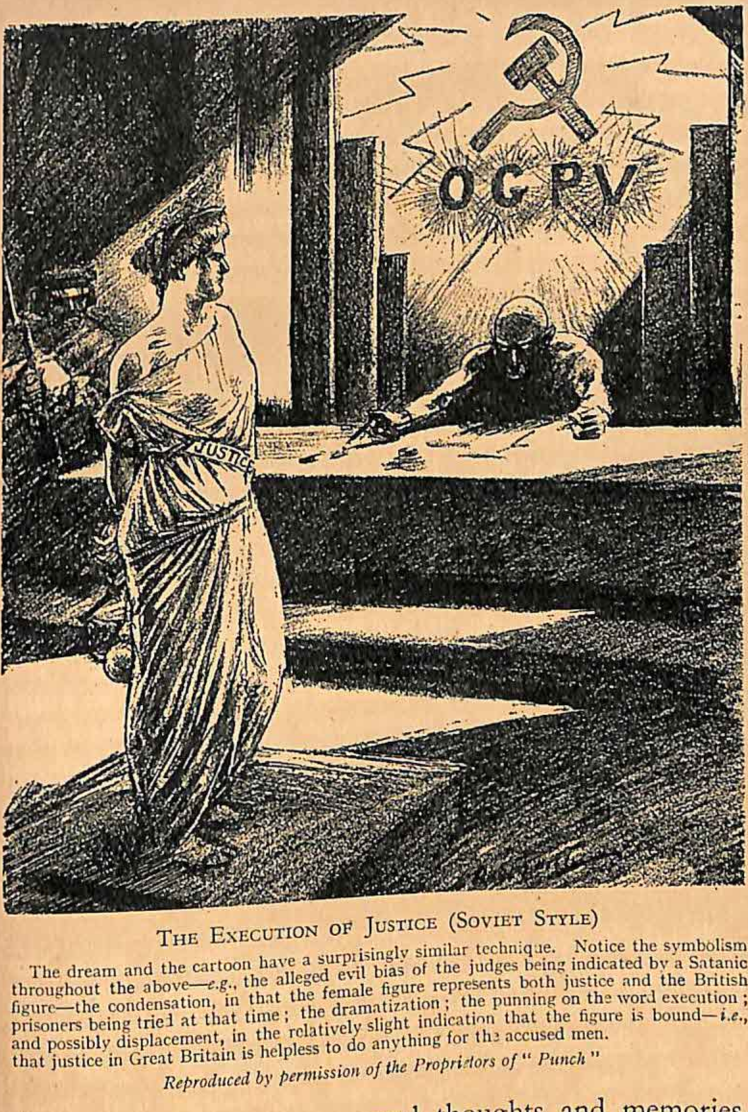
Symbolization is in any case inevitable when abstract ideas have to be expressed by visual images, just as a cartoonist represents the political situation symbolically. But the dream also uses symbols as a part of the disguising process. Among common symbols recognized by psychoanalysts are the representation of father and mother by king and queen, emperor and empress; of brothers and sisters by little animals, toads, worms; the human body by a house; being born by the image of emerging from water; dying by the dream of going on a journey. Yet symbols cannot be mechanically interpreted in the manner of a 'dream book,' since each person has to a considerable extent his own coinage, depending upon the way in which things have been associated in his own experience. Thus, for one person 'going to a theatre' may symbolize getting married, because she has associated it with the display of a wedding; whereas for another it may mean the intention to escape from a difficult situation, because he has always gone to drama as an escape from reality. For this reason, and because of condensation and displacement, the dream cannot, as it were, be translated word for word.

Through the dream Freud showed how one might detect the repressed forces buried in the unconscious. And at this point his clinical experience forced him to the view that the repressed impulses of most people are mainly sexual, and it was his simple statement of this finding which at once aroused such a storm of indignation among laymen and practitioners alike. Undoubtedly the sexual instinct is one of the two strongest instincts in the human make-up. But it is not the strength of the instinct alone which matters: equally important is the amount of repression which it has to undergo in the course of everyday life.

If eating and drinking were to come under the severest social taboo, being regarded as disgusting and improper, the unconscious would be constituted largely by cravings of this kind, and our dreams would be full of disguised satisfactions of eating and drinking.

A glance at the list of instincts will show that none is banned to such an extent as the sexual drive, although self-assertion and fear are also frowned upon in certain circumstances. That is why, next to sexual phantasy, our dreams and day-dreams are most occupied by moments of successful self-assertion, in which the snubs, failures, and humiliations of the day are forgotten; and why we experience nightmares, in which the repressed fear gets its due innings. In peace the fear instinct is little involved, but when the blast of war blows in our ears we are all too frequently called upon to look unconcerned during moments when we would fain let terror guide our feet. Consequently, war dreams and the mental disturbances caused by war are most frequently based on the repression of that instinct. Freud had passed, before the War, to the point of asserting that the whole of the unconscious is sexual, but it was hard, in spite of that limitless ingenuity for which the psychoanalysts are famous, to explain the mystery of 'shell-shock' cases on a sexual basis. Any instinct may get tied up in the unconscious, depending upon the social pressure which is being applied at the time.

Conflicts in the mind are not always between the riff-raff of the unconscious and the organized forces of the ego. Instinct may frustrate instinct, and, indeed, repression must be considered as only a special case of this action—namely, the case in which the organized instincts constituting the ego frustrate some incompatible unorganized drive. Thus, a woman's pride, springing from the self-assertive instinct, may come into conflict with the satisfaction of her sexual instinct; she may have to deny



THE EXECUTION OF JUSTICE (SOVIET STYLE)

The dream and the cartoon have a surprisingly similar technique. Notice the symbolism throughout the above—*e.g.*, the alleged evil bias of the judges being indicated by a Satanic figure—the condensation, in that the female figure represents both justice and the British prisoners being tried at that time; the dramatization; the punning on the word execution; and possibly displacement, in the relatively slight indication that the figure is bound—*i.e.*, that justice in Great Britain is helpless to do anything for the accused men.

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herself love and repress sexual thoughts and memories. In such a battle the more powerful instinct wins expression, and the less powerful is forced underground. Dreams are the distorted and disguised expression of these hidden conflicts.

We will proceed briefly to analyse one or two typical dreams on the basis of these principles.

A young man had reached a critical point in his career in the technical branch of a big business, and was faced with the necessity of two or three years' intensive study and application in order to establish himself satisfactorily. He related the following dream :

> I entered a luxurious building, apparently a skyscraper, and joined some friends in a lift. The lift was crowded and irritatingly slow in movement. I saw a cottage through the window and got out. I was now in a pleasant countryside, and I wandered down a lane, looking for the cottage. A tremendously long charabanc, full of people, rushed down upon me, causing some anxiety. As it passed closely I noticed that the chauffeur was like my father, but was dressed in what appeared to be an admiral's uniform. I was conscious of my precarious position on the bank bounding the lane. The lane got very narrow, and ended in a flight of steps, up which I walked to the door of the cottage. The garden was full of waving plumes of pampas grass. Inside I continued climbing, up some rickety wooden stairs. It was dusty and repugnant, and my limbs seemed very tired. Suddenly I came upon a lift, which my father was operating. I went in, and continued to ascend in the open air above a mountain-side.

Practically all this manifest content derives from the previous day. The dreamer had visited a rather luxurious block of business offices, and had ascended in just such a lift. In the evening he had been sitting on a gate in a field, looking at a cottage, when a charabanc had drawn up and unloaded its passengers near by, to his annoyance. Associations given on analysis were as follows :

Father: I have always had considerable respect for him, and he has always urged me to work hard to achieve my ambitions.

Admiral's uniform: As a boy I was ambitious to join the Navy, being impressed by the idea of wearing gold braid like an admiral. The lift attendant yesterday had a very smart uniform.

Cottage: I once said to Helen[1] that it would be lovely to spend a holiday together in a cottage like the one we were looking at—the one I saw yesterday.

Stairs: I remember climbing such stairs in a very poor house which I had to visit some weeks ago. I was feeling very oppressed by the sense of poverty about the place.

We may now begin to interpret by examining the work of each of the dream processes:

Symbolization.—Rising in the lift in the skyscraper seems to represent promotion in business. Cottages, according to Freud, frequently symbolize women, and particularly the sexual organs or womb. Incidentally, Freud and his fellow-practitioners maintain that of all symbols those representing male and female sex organs and copulation are the most common—the male organ being represented by sticks, towers, guns, *fleurs-de-lis*, the head, etc., the female organs by caves, boxes, windows, churches, drawers, cupboards, and sexual intercourse by going up stairs, climbing, flying. The charabanc full of people symbolizes public opinion and the disapproval of the young man's father, which prevent the young man from living with the young woman (cottage).

Dramatization.—The father represents the inhibiting forces in the young man's personality. This is no unusual thing, for the father, according to Freud, stands in the way of the boy's sexual attraction to his mother, and becomes the prototype of all the later forces inhibiting sexual expression. At the same time the strength, power, and importance of the father awaken the boy's admiration, and form a pattern on which he models his ideal self. The father, therefore, stands for the youth's own ideals, as is additionally proved by the admiral's uniform.

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[1] The name of the girl with whom the young man was in love. She worked in the same office. There were financial obstacles to their marrying, and they had once contemplated living together when occasion permitted, but he realized that this too meant risking his business ambitions.

Condensation.—' Going up steps ' at the cottage is a condensation of sexual intercourse and poverty. The symbol, as psychoanalysts say, is ' over-determined '—fixed twice over. Similarly the father is a condensation of ambition and the power of public opinion.

Displacement.—There is only one clear case of allusion here, of far-fetched reference, actually in the form of a pun, a thing which is by no means uncommon in dreams. Recollecting the pampas grass of the cottage, the dreamer is particularly struck by the " plumes." The name of the young woman was Plumer. Possibly the admiral's uniform is also over-determined as a pun on the word ' admirable ' —expressing the young man's basic attitude to the qualities and beliefs which he had chosen to incorporate in his ego ideal. Displacement of emotional emphasis can be seen in the minor part played by the lift incident, which represents the main emotional drive in the conflict.

The unconscious struggle is now revealed as a conflict between an obstinate sexual fixation, on the one hand, and the forces of the self-assertive instinct (as involved in the ambitions of the ego) and the fear instinct (as aroused by public opinion), on the other. The man had never openly faced this situation, and was at heart thoroughly ashamed of the strong sexual element in his relation to the woman, for he had been rigidly and hypocritically brought up. Already the conflict was beginning to give rise to symptoms of an anxiety state, which rapidly cleared when he faced the inner nature of his conflict.

An attractive, conventionally educated, but rather highly sexed young woman related the following dream, which occurred shortly after her parents had forbidden her to see a young man of whom they did not approve :

> I met K.[1] outside the house. Something violent happened —possibly a motor accident, but I can recall nothing now, and I found myself carrying his head indoors.[2] Without any feelings of horror, but with some fear of people seeing me through the window, I opened the bottom drawer of my chest of drawers. It was full of underclothes, etc., and I laid the bleeding head on my pyjamas.

The interpretation of this dream should not be difficult in the light of the foregoing principles. Possibly it illustrates, too, the 'ambivalent' attitude (love and hate for the same object) which is so frequent a feature of the illogical unconscious, the hate in this case being directed against the young man for something which, in fact, he could not help—his absence.

There is no end to the depravity of the dream. For, as Plato pointed out long ago, the bad man does what the good man only dreams. Practically every dream of the death of a relative is a definite wish fulfilment, although the wish may no longer be in that form. Frequently it is the survival of a childhood wish, when death is only thought to mean a going away or when the full extent of the desired penalty is not realized. The dream brings home to each one of us his kinship with the criminal and the lunatic. The dozen murders that take place in the civilized world each day are matched by millions in the shadowy recesses of dreams, for the dream releases the untamed primeval urges upon which the crust of civilization is with difficulty being built.

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[1] The young man.

[2] Note extreme displacement : omission by censorship of crudest parts.

While the psychoanalysts, with Freud at the head, have pierced the veils of the dream structure in this way, more cautious and experimentally minded scientists have attempted to penetrate the chamber of sleep from another side, by more laborious methods. One investigator wished to see how much truth there is in the popular theory that external sounds and general contact stimuli decide what the dream shall be about. (This, the 'indigestion theory' of dreams, may be said to have held the field, all unconfirmed, before Freud.) This good scientist, who must have valued his beauty sleep very cheaply, stuck various kinds of plaster, with delayed irritant action, on various parts of his anatomy and went to sleep. His dreams generally, but not always, showed a connexion with the part of the body affected. For example, a plaster on the foot caused him to dream that he was at a dance, on another occasion that he was running away from a wild animal and had caught his foot. Similarly, the noise made by a piece of clockwork was woven into the dreams now as an aeroplane, now as a waterfall, and, again, as the noise of an angry crowd. These findings, therefore, do not disprove the instinct theory of dreams, for the external stimuli can be shaped to a manifest content suitable to the expression of the urges concerned.

There has long been a scientific rumour to the effect that even the longest dreams take place in only a few seconds. Ingenious experiments with alarum clocks, sounding twice with a very short interval between, show that this notion is quite true. Yet there is nothing peculiar about the dream in this respect: the time taken, although infinitely shorter than that necessary to live through the events, is no shorter than that required to run over the narrative in waking thought—*i.e.*, it is a matter of half a minute or a few seconds. Thus, after centuries of superstition, has the dream been turned to scientific account.

Yet there are still tremendous things to be found out about the mind in sleep.

And now, returning to Freud's Odyssey through the manifestations of the unconscious, we find him contemplating the problems of wit and laughter. Philosophers have looked in all manner of likely places for the springs of laughter, but never thought to find them bubbling from the same source whence issue the shapeless vapours of the dream.

It was in 1905, soon after he had written his treatise on dream motivation, that Freud presented his evidence for regarding wit as a product of the unconscious mind. Among previous more or less apt speculations on the nature of laughter one must give due prominence to that of the philosopher Hobbes, which regarded the pleasure as deriving from "a sudden glory at the downfall of another." That this is a most frequent source of laughter all cinemagoers can observe for themselves. But can everything be reduced to this simple formula? Herbert Spencer, on the other hand, thought that laughter was a channel of overflow for superfluous energy. But do we not laugh, and very heartily, as we stagger home profoundly tired from some convivial evening? Bergson argued at great length that we laugh at people whenever they behave in an odd, awkward, clumsy, or machine-like fashion. This theory, which reduces laughter to a social duty with the object of disciplining the unpolished, has only the merit of being itself funny.

Of all accounts of laughter, that of McDougall fits most beautifully into the facts. We laugh, he says, in situations where, but for laughter, we should cry. There is a part of the herd instinct—namely, the tendency to primitive passive sympathy—which causes us to share instantly and directly the feelings of those around us. Since there is always some one in trouble, our minds would constantly share every passing pain and shock, mishap and humiliation. The instinct of laughter avoids this waste of nervous energy, by turning all minor mishaps into occasions for pleasurable feeling. In minor happenings troubles shared are troubles doubled. If my friend, who lacks a sense of humour, winces whenever I hit my thumb with a hammer, it is far better that he should wield the hammer, in order that one of us at least may be amused.

When Nature evolved highly sensitive and sympathetic nervous systems she might have protected them, in a too harassing world, by providing each with some deadening opiate. But she went one better in evolving a device to transform pain into pleasure. This device we know as 'a sense of humour,' a feature conspicuously absent from the less sensitive and imaginative brute creation. We now perceive the truth in Hobbes' theory. The "sudden glory" is a clever transformation of the distress we should otherwise sympathetically feel in contemplating the downfall of another. And in time we learn to laugh even at our own downfall, thus doubly transmuting life's leaden metal into gold. It is in keeping with this explanation that the greatest comedians and humorists have been men with the greatest capacity for sensitive and sympathetic understanding.

Yet there is a measure of truth in the other theories too, especially the surplus-energy theory. We laugh and joke particularly at times when we are suppressing some instinctive impulse. Men jest feebly and laugh with hysterical violence in times of great nervous strain, as when they are filled with fear which they will not permit themselves to express. Laughter is the universal safety-valve through which escapes the energy aroused in other instinctive channels, but denied opportunity of expression in action.

✓ Freud was principally concerned with another aspect of the situation—namely, the mental processes underlying wit, which, along with the comic, is the main excitant of laughter. He began by showing that we find the same processes—condensation, displacement, regressive symbolization—in wit as in dreams. Likewise, wit appears to be a means of gaining expression for repressed tendencies. Let us study some examples of these processes.

A contributor to *Punch* speaks of the Christmas festive season as the "Alcoholidays." Here, says Freud, we have a condensation precisely similar to that in dreams, whereby two thoughts in the latent content are compressed into one notion in the manifest content. The same wit process was employed by the man who spoke of having dined *tête-à-bête* with a rather unwelcome acquaintance.

Every experienced analyst of dreams realizes that the pun is one of the most frequent forms of allusion employed in the dream work. It is significant, therefore, to find that punning is the most common, though not the highest, form of wit, and that it appears in a great number of jokes which, superficially, are not of the pun form. "Women have too much bias," complains the critic. "Yes," says the husband; "buy us this and buy us that." And the same process creates unconsciously the humour of the schoolboy in such howlers as "A grass widow is a woman whose husband has died of hay-fever."

The succinctness which we value so highly in wit is very frequently arrived at by a process exactly similar to that in dream symbolism, except that the meaning of the symbol cannot be peculiar to the person making the wit, but must be known to all (or readily discernible by all). There is a story of a doctor who had a very fault-finding disposition, but who was reputed to be none too good at his own work. One morning he paused to watch a bricklayer repairing the garden wall and smothering the faulty lines of the bricks with a plentiful application of mortar. "Ah," he sneered, "one can hide a lot of faults with a trowel." "Yes," replied the workman, "and with a spade." To a child, who does not perceive the allusions, this is just a simple story about a trowel and a spade—as simple and pointless as the dream which the adult narrates at breakfast-time. But what a wealth of emotional significance lies behind both when the transforming processes are taken into account!

The dream may give us the key to the mechanisms of wit, but we shall have to probe deeper to understand how the pleasure of wit arises. Firstly, says Freud, it springs from that brevity which Shakespeare recognized as being the soul of wit. Wit makes an enormous economy of mental energy by unexpectedly presenting a great deal of thought in one or two words. Moreover, because of the wit disguise, we are, for just a fraction of a second, puzzled and perplexed. We prepare for a large expenditure of mental energy, when the resistance suddenly collapses, and we shoot forward with unexpected ease. Like a man who is prepared for a heavy bill and finds an insignificant one, we are overcome with pleasure. Every success, every unexpected economy of nervous energy, is at once pleasureable; that economy, in fact, is the biological meaning of pleasure.

Yet that is only the beginning of the pleasure in wit—just the fuse powder that lights the way to the real explosion. In wit we also gain pleasure from falling back to childish, unhampered ways of thinking which are characteristic of the unconscious. The real world, to which an adult has to shape his thinking, demands that the thinking be realistic, precise, logical. It is an immense pleasure at times to throw off the yoke of reality, to abandon the strain of such thinking, and to regress to the irresponsible, nonsensical attitude of childhood. Wit, with its queer mixture of sense and nonsense, is a legalized avenue of regression for tired minds.

But the greatest pleasure of all arises from the release of motives and wishes normally repressed. That is the final resemblance to the dream. The thing is even clearer when we let our minds run over the principal themes with which wit concerns itself. They are strikingly similar to those of

Client (to Solicitor): "So I said to them, 'I've tried to get a settlement by fair means and failed. You will now hear from my lawyer.'"

A joke in which the 'downfall of another' (self-assertive and sadistic) tendency gets an innings (both at the expense of the woman and of lawyers).

Reproduced by permission of the Proprietors of "Punch"

the dream. In point of numbers, sexual themes come first. Then follow all sorts of situations in which repressed self-assertion gets its innings. But here, since the joke, unlike the dream, is a social affair, assertion cannot attain direct expression by exalting the self. It does the next best thing: it reduces others. Generally the shortcomings and failures at which we laugh must be well-known ones, and such that all the members of the group enjoying the joke can feel superior to them. This is the motive that finds expression in many national jokes, as when we laugh at the quaint stupidities of Irishmen, the disregard for cleanliness among Frenchmen, the cupidity of Jews, and the meanness of Scotsmen. There are still more generalized examples of human weakness, at which all can laugh: the odd behaviour of intoxicated men, the circumspection of the man who always thinks discretion is the better part of valour, and, nowadays, the plight of the motor-hunted pedestrian. With marriage and mother-in-law witticisms we touch institutions against which notoriously there smoulders a repressed—*i.e.*, not socially respectable—opposition, aptly expressed by the married man who, being told that statisticians had found married men to live longer than single men, replied, "No—it only seems longer." Only in wit can the married person express the irksomeness which even the happiest marriage carries in its debit column.

Finally, we may ask why wit is permitted to circumvent repression. What is the censor doing about it? That convention (and therefore our own consciences) permits this release of anarchic elements is mainly due, according to the Freudian view, to the disguises which wit, like the dream, adopts. Oftentimes, too, it would puzzle a man greatly to say what particular repressed elements are gaining expression in a jest which he nevertheless hugely enjoys. We permit some escape through the safety-valve of wit, providing that there is a good disguise and that no strict inquiry is made as to the antecedents of the impulse. This weakening of the forces of repression is greatly aided by the initial pleasure in the technique of wit—*i.e.*, the economy pleasure. This distracts attention, lulls the guards, and bribes the censor, permitting the release of the explosive urges penned within the unconscious.

Thus has Freud, with the swift intuition of genius, connected the clinical study of the insane, the problems of dreams, and the riddle of wit in a single universal principle. There remain many obscurities, and there is a great deal of consolidation to be carried out by patient scientific research, but the foundations have been truly laid in one of the most important branches of the science of mind.

CHAPTER VII

LOVE, LIFE, AND LUNACY

A CENTURY of unprecedented denial, repression, and disavowal of the animal instincts at the basis of human conduct had just come to its close when Freud published his theory of dreams, in the year 1900. Respectability, smugness, and their ugly sister, hypocrisy, had set a frozen grip upon social thought and custom. Perhaps it is no accident that a healthier willingness to recognize and respect the animal instincts at the foundation of our minds has grown up with the century which began with so downright a challenge.

And the gauntlet had been thrown down in earnest, for a few years later Freud raised a storm by insisting that the main impulses of childhood and infancy are of a sexual nature. He asserted this as a scientific hypothesis, but he set alight something deeper than the scientific conscience of his opponents when he did so. Even many of his previous followers deserted, leaving him to face the outraged world alone.

Medical men and such fearless investigators as Havelock Ellis had long since come to the conclusion that childhood's 'age of innocence' was the uncritical invention of superficial poets. Freud's notion, however, was of revolutionary completeness. He asserted that all mental energy and all the driving forces of human nature were sexual in origin. In adult life this energy—this 'libido,' as he called it—split into various channels, some clearly and definitely sexual, others outwardly concerned with other goals. But in infancy there was just one diffuse sexual satisfaction—in sucking at the breast, in enjoying the warmth and pressure of the mother's embrace, in urinating and defecating, and in being fondled and caressed by the mother.

THE AGE OF INNOCENCE

Are the caresses of infancy as free from true sex feeling as the sentimentalists would have us believe, or are they the very essence from which adult sexuality becomes distilled?

By courtesy of Kodak, Ltd.

Sexual drive suffices to lead the infant to the satisfaction of all his life needs.

At this point Freud introduced a new principle of the utmost value—the notion of the pleasure principle and the reality principle. The infant begins by living solely for the satisfaction of its bodily pleasures. As it gets older, and comes into contact with other children, with adults, and with the obstinate realities of the physical world, from which its mother no longer completely shelters it, the libido ceases to be able to find such easy direct satisfactions, and has to face up to the demands of the reality principle.

Therefore, says Freud, the impulses and memories of our first two or three years of life, which are lived mainly according to the pleasure principle, are relegated to the unconscious—which always remains at the pleasure-principle level—while the conscious mind becomes increasingly an instrument adapted to reality and conversant with social repressions. And that is why we forget the experiences—the untrammelled sexual delights—of early infancy. 'Fading out' would not account for so abrupt a limit which all of us find to the number of years we can explore backward into the realm of childhood memories. Repression drops the curtain at about the end of our third or fourth year.

The libido alters its expression in other ways at the same time. In early infancy the sexual pleasures of the infant are centred in its own bodily processes. It has no affection for anything outside itself. The libido is said to be at the 'auto-erotic' or 'narcissistic' stage, because it is turned in upon itself. The child—like Narcissus in the Greek myth—is in love with itself.

Soon, however, the libido advances to other objects, and what more natural than that it should attach itself to the mother, who is the giver of all good things? This sexual attachment functions until about the end of infancy (the seventh year or so), when an increasing awareness of the strong social barriers against incest causes a repression of these infantile desires into the depths of the unconscious. The boy now breaks loose from his mother, becomes an independent little boy among boys.

Thus arises one of the most powerful complexes affecting human life—the Œdipus complex, so named after the Greek myth of Œdipus, who, impelled by destiny and unknown to himself, killed his father, the king, and married his own mother.

There is convincing evidence, incidentally, that those myths which occur, again and again, unaltered in essentials, among all peoples and in all languages, are symbolic, dramatized representations of complexes and deep-seated conflicts which, because of similarities of social and family life, occur universally.

A secondary result of the boy's desire for his mother is that he resents the intrusion of the father. A good number of people who are in constant rebellion against all sorts of authority are working off the urges of an active Œdipus complex—fighting the image of the father.

A girl child similarly becomes attached to the male parent, and regards the mother as a rival. In later life this unconscious attachment to the father may prevent her from ever being able to fall in love with a youth of her own age, and may, in any case, determine the type of man with whom she is able to fall in love.

How then does it come about that, although all possess an Œdipus complex, only a few become neurotic? We do not yet know for certain. In many instances an unwise and too lavish display of affection by the parent of opposite sex has resulted in too strong an attachment of the libido. In others a series of failures and disasters in the attempt to live on an adult plane of emotional life has discouraged the individual, and his libido has returned to earlier attachments where it was more successful in finding adjustment. But others, like Peter Pan, just don't want to grow up. The paradise of childhood calls, and they slip back through the gates of reality to the old satisfactions of the libido.

A great number of neurotic states are to be understood as emotional regressions to the Œdipus relationship, or even to the primary auto-erotic level.

Freud's detailed analyses are too lengthy to quote here, but we may give instances from his disciple Wittels. A man with chronic neurotic troubles came to Vienna from abroad for treatment.

> His mother accompanied him on the journey. The mother was sixty; the patient was thirty-five, married, with two children. He was an agriculturist.
>
> "Where is your wife?"
>
> "She makes me nervous. When I am ill—I suffer from debility, sleeplessness, and hypochondria—I get on better with my mother."
>
> In the course of the analysis the patient informed me that he had always been a 'mother's darling,' and that he has a preference for the society of elderly women. He remembered an old washerwoman who, after she had done her day's work, used to wash her feet in the courtyard. To do this she kilted her petticoats above the knee. The scene exercised a sort of magical lure upon the patient, who was then fifteen years old. He would crouch for hours at a window lest he should miss the chance of seeing the old woman at her toilet. When he was rewarded for his pains he would become sexually excited, and would masturbate.

Another case from the same notebook will illustrate the varying patterns which the same unconscious drive may force into one's conscious life:

> A young man, inclined to melancholia, told me that when he was seven years old his widowed mother had made up

her mind to marry again. He had spent many sleepless nights wondering what he could do to dissuade her. At length he decided to write to her (he was away at a boarding school), suggesting that she might be content with a baby's comforter which he had picked up in some nursery. Many people will say that the boy must have been an infamous little wretch. I am inclined, rather, to be touched by the pathetic resolve of this little Œdipus. The same man was only satisfactorily potent once in his life, and that was with his wife's mother. When the old lady died suddenly, the man left his wife, who no longer had the smallest interest for him. Since then he has been a misogynist, unfit for work, and melancholy.

These examples do not show a further complication which is very frequently present—hostility towards and fear of the father. The reader may at this point object that many boys have a sincere love for their fathers—still more, girls for their mothers. It is possible for hostile and affectionate feelings for the same person to coexist in what Freud has called the 'ambivalent' attitude. Most frequently this arises when one impulse, the less respectable one, hails from the unconscious, while the other is fully in consciousness.

One meets people of good ability and sometimes of charming personality who seem doomed to fall out with whatsoever person is put in authority over them. Invariably good reasons can be found for the rebel's behaviour, but, when he has lost three or four positions through it, we perceive a stereotyped form running through each of the dramas—the pattern of the Œdipus complex.

If his revolt in each instance reveals grounds of provocation, that provocation may yet have arisen because his identifying of authority with the hated father itself excites a persecutory and overbearing reaction on the part of the person in authority. For this reason it has well been said that we carry our destiny in our unconscious minds. By these forces, unknown to ourselves, the history of our lives may be moulded.

There are also people who 'seem to have all the luck,' and others whose enterprises persistently founder on what at first sight appears to be a run of unlucky accidents. We know that such accidents may be manufactured by the unconscious, perhaps as part of a death wish. If mathematics tells us that a sequence of mischances is greater than the law of probability can account for, then we may turn to psychology for the explanation.

Such an inflexible working out of our lives, as if to a foreordained plan, has not escaped the notice of those novelists and dramatists, either of the modern, analytical age or of previous ages, who have been most famed for holding the mirror up to nature.

The Œdipus complex, as befits its importance among these *motifs* of the unconscious, has been well portrayed in characters so far removed in time and type as Shakespeare's Hamlet and Aldous Huxley's Spandrell of *Point Counter Point*. Why does Hamlet harbour such bitterness for his uncle stepfather? Among most peoples of the earth it is no incest for a man to marry his deceased brother's wife. Why then does Hamlet wax morally indignant over the incestuousness of the relation? Because in his unconscious mind he has himself been desiring above all else to commit incest with his mother. His Œdipus hostility to his father was more than held in check by the ambivalent ties of affection and admiration which every child consciously forms for a kind father. This interloper, however, steps into the shoes of his father without commanding the affectionate regard which would have checkmated the hostile forces of the unconscious; and so they gradually advance to the complete expression which they get at the climax of the play.

The tragedy of Spandrell's life is drawn with exquisite analytical skill and with the cold irony of a scientific mind exposing the crassly unscientific way in which society educates its sons. Spandrell revenges himself on all women for the unfaithfulness of the archetypal woman—his mother. And in the person of Webley he murders the arch-father, who has wrecked his childhood paradise.

Paradoxical though it may seem, the light-hearted Don Juan is a victim of the very same unconscious fixation. In some types, as we have seen, this fundamental reversion of affection to the mother results in an unchanging coldness to all eligible women, or an implacable hatred towards all the powers that have obstructed that affection. How can the same mechanism account for the inconstant flight of Don Juan from flower to flower? We find constancy in his inconstancy. He is engaged in a fruitless search for the lost mother-image—a search in which he is bound to meet with unending disillusionment.

Freud's conceptions of infantile sexuality, of repression, and of regression certainly gave for the first time an understandable picture of the mechanisms behind neurotic behaviour, and, what is more, brought relief to those tortured by obsessions, hysterias, and anxieties.

And now Freud lost no time in attempting, with the same principles, to penetrate the more profound darkness which surrounds the true insanities.

There is a particularly malignant form of insanity known as 'dementia præcox,' so called because it is peculiarly liable to attack the young, especially during adolescence. The typical dementia præcox patient is reticent and seclusive, passively obstinate, shy, sensitive, socially inadaptable, and inclined to live excessively in a world of phantasy. He becomes gradually more shut-in and inaccessible, does not participate in the pursuits and emotional life of others, and pays little attention to what is going on around him. Thence he may sink into a state of complete apathy and stupidity, occasionally broken by emotional outbursts of laughter, rage, or weeping which have no conceivable relation to anything happening around him. He may indulge in silly laughter while relating an attempt at suicide, weep for no reason at all, or burst into rage on being asked a harmless question.

And in the long periods of strange, vacant brooding no one can tell what thoughts and feelings, or shattered fragments of thought and feeling, are passing through his mind; for the patient lapses with the years into a state of idiocy, rarely recovers, and can give no account of his experiences if he does.

Freud pondered this riddle in case after case brought to his consulting-room, and concluded—the arguments are too detailed to introduce here—that, just as most neuroses were a regression to the Œdipus attachment, this insanity was a further regression—right back to the primary, auto-erotic fixation of early infancy. There the libido has no social contacts; it is attached to the child's own person and bodily processes. Some psychoanalysts assert that it is even regression to the protected life of the mother's womb. And, indeed, it is a curious fact that many dementia præcox patients have a habit of sitting coiled up in the typical position of a fœtus in the womb.

Since, according to the sexual interpretation of the libido, or life force, this primary state is essentially a state of being solely in love with oneself, it has, in other manifestations, been called narcissism, as already mentioned, after the Greek myth of Narcissus, who, forgetting the calls of the sweet nymph Echo, fell in love with his own reflection in the pool.

Like the Œdipus fixation, it successfully prevents attachments to persons of the opposite sex. But in some cases it does more: it seduces the mind from its attachment to life itself.

Are these far-fetched theories? Only in so far as we fail to see beyond the everyday, narrow meaning of the word 'sexual' and to realize the immense transformations, almost beyond imagination, that take place in our drives and desires as we develop from birth to manhood. And, in the cure of neuroses at least, the theories work.

Freud launched these fantastic hypotheses in the midst of a stony silence—the silence of hostility and outraged authority—which changed rapidly to a flood of criticism and invective.

In the early years of the century, however, there gathered around his standard men of the highest culture and scientific genius. At Freud's house in Vienna there were regular meetings, at which, over black coffee and through the veils of cigar smoke, the new theories were tested in the furnace of discussion by brilliant minds. Cases were compared and analysed. And always, when a wall of obscurity barred further advance, the penetrating mind of Freud would show the way through.

Yet this harmonious psychoanalytic nest was destined to produce some cuckoos who would soon rend its peace with the noise of discordant and rebellious theories. Jung, a Swiss physician, revised the theory of dreams, showing that dreams are not only the reflection of a conflict, but also a constructive attempt at solution. In fact, he showed that dreams frequently foreshadow the solution that we shall later consciously adopt. That is the element of truth in the common notion that dreams foretell the future. Dreams express wishes of which we are scarcely aware, but which tend to work themselves out in our lives, eventually producing in reality that which we dreamed. Jung showed, too, that certain dreams and dream symbols are astonishingly similar among people widely separated over the earth and having no recent cultural contact. He concluded that each one of us bears in his unconscious mind an inheritance common to the race, consisting of all those dim, far-off, primitive situations in which the race dwelt for so long a time.

We have each a personal unconscious, consisting of things repressed in our own lives, and a racial unconscious, consisting of memories and ways of thinking which the race as a whole has put away.

CHAPTER VIII

VICTIMS OF THE WILL TO POWER

AT this point an incident occurred which throws much light on the controversy as to the scientific character of the later psychoanalytic theories. Alfred Adler, like Freud a Jewish physician in Vienna, and one of the latter's most able followers, developed so radically different a theory of nervous disturbances that he quickly found himself compelled to retire from the psychoanalytic circle. This was the beginning of proscription and heresy-hunting, which threatened to mark off psychoanalysis as a religion rather than a science.

Adler had found that in many analyses the thread of neurotic troubles led back, not to any sexual incidents, but rather to some sense of inferiority—some situation in which the patient had been made to feel desperately inferior and insecure. This hurtful shock the patient rapidly seeks to repress and disguise. He reacts to the inescapable feeling of inferiority by strong compensatory efforts at self-assertion. His pervading inferiority sense can only be washed out by some quite distinguished achievement or superiority. Thus weakness begets greater than normal strength, as happens also in the physical body when the bone of a broken leg grows not weaker, but thicker and stronger than that of the other leg.

A sense of inferiority is normal to the state of childhood. Every small child, whatever its nature, has constantly impressed upon it, by the forceful logic of circumstances, its own weakness, ignorance, and dependence. Its greatest desire is to attain to the godlike power and knowledge of adults. If now, in addition, the child has some physical inferiority—poor eyesight, chest weakness, lameness, speech difficulty, a snub nose, freakish ears—there is a powerful

A SENSE OF INADEQUACY IS NORMAL TO THE STATE OF CHILDHOOD

When exaggerated by unwise teaching or unfortunate physical shortcomings, it becomes a torturing sense of insecurity—an inferiority complex—that may lead to a neurosis or to great eminence in adult achievement.

By courtesy of Kodak, Ltd.

urge to compensate in some way; its self-assertion assumes a morbid intensity and an insatiable quality.

Many men of genius have been tortured by such an urge into the transcendent performances with which they have astonished the world. Frequently the one compensation has been brought about in the very place where the weakness originally lay. Demosthenes, the classical instance of a great orator, began life afflicted with a stutter.

Stilicho and Torstensson, beginning as crawling paralytics, became generals famed and dreaded for the rapidity of their movements. Great musicians like Beethoven and Smetana have become deaf at a comparatively early age. The ear weakness was already there, less insistently, in early childhood, and focused the direction of effort to its eventual fruition. Napoleon's mother always treated him as a rather incapable child: his over-compensation extended far outside his family.[1] And there have been darker geniuses of this kind, like the weakly Robespierre, who

NAPOLEON BONAPARTE
Was his destiny the working out of an inferiority complex?

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[1] But apparently he never altered his mother's contemptuous attitude towards him.

sought to wash away the painful inferiority of his youth in the blood of a proud and stiff-necked aristocracy.

But what has this to do with the neurotic? An inferiority complex, wedded to great talent, may drive a man up to the unstable pinnacles of genius. Yet what must happen when, as in the majority of instances, it is bound up with mediocre ability or no ability at all? The unfortunate individual, obstinately persisting in his strivings for the fictitious goal of godlike power and declining the sociable live and let live which make life congenial to normally balanced personalities, knocks his head again and again against the realities of his environment. At some point a profound discouragement sets in—a desire to flee from reality, to give up the grip on actuality rather than the goal of godlike power. Then the unconscious finds a way of escape, by creating a neurosis.

We appreciate the true meaning of the neurotic's symptoms when we understand his unconscious life-plan. He falls ill because he can comfort himself with the reflection that he is now no longer expected to reach his goal. "If I had not this illness there is no knowing what I could do, but . . ." The particular form which the symptoms take depends upon accidents in the patient's history, and also on any latent physical weaknesses which he may possess. A man falls from his motor-cycle and suffers a slight injury to his right arm. When it is healed, however, he is left with a tremor of the right hand which completely prevents him from writing. No organic cause for this can be detected, but the nervous origin becomes more clear when we recognize in him the typical attitude of the inferiority complex, and learn that, being uncongenially employed, he has been trying, with little success, to make a name for himself as a novelist.

A young married woman suffers from an obsessive dread of open spaces. If she goes out in a busy street she may have a severe fit of anxiety. Then, she says, everything goes black before her eyes, and she may faint unless she can save herself by running into a house. On analysis it was found that her childhood had been passed under conditions provocative of an acute inferiority sense. At adolescence she had a fixed intention and ambition to make such a marriage that she would cut a resplendent figure in society, go about attending fashionable meetings, and shine intellectually. She achieved the first part and married a rich husband, but her education, her intellect and personality made the latter part much harder than she had supposed, and she was faced with the necessity of confessing herself a failure (to herself). The neurosis saves the situation, for if she cannot bear crowds and open spaces she obviously cannot attend these functions, and is thrown back upon the smaller, protected world of her own home, where there is no competition.

Adler's asides, recorded by Wittels, on the case of a young girl who had refused food and become terribly emaciated, sum up the theory of the inferiority complex. "Just look at her!" he whispered. "See how she crouches there like a lioness, how she clings to her illness simply because she wants to play the tyrant in her home circle. What a pitiful waste of energy!"

With this new hypothesis Adler unceremoniously dethrones the sexual instinct, the libido, from its position as the most powerful source of human energy, and sets up the self-assertive instinct in its place. For Freud "'tis love, 'tis love that makes the world go round"; for Adler it is the lust for power. It is the same contrast that holds in the ethical world between Christ, holding up the virtue of love, and Nietzsche, the Antichrist, exalting the will to power.

Not that Adler denies any place at all to the sexual instinct: he merely says that many conflicts which appear to be in the realm of sex are at bottom not sexual at all. In every life there are three main difficulties to face: sex, society, and subsistence. On any one or all of these we may break down, owing to possessing the attitude of the inferiority complex. A mild degree of inferiority sense is widespread, and few can react with the happy simplicity of the office-boy, who, appearing amiably at the office some days after he had been sacked, was asked if he had come to look for a job again, and replied, "No, I merely wished to know if the firm was still in business."

DR ALFRED ADLER

Adler sought to prove that abnormality of the will to power rather than the sex drives is the most common root of nervous disorders.

Photo E.N.A.

Even problems in the sexual sphere may not spring from the libido, says Adler. One may instance his analysis of sexual frigidity in women. One of the most widespread inferiority complexes is due to being born a girl child rather than a boy. The little girl senses the higher social estimation of the boy, and is hedged in by all sorts of restrictions which the young male escapes. Here is an ideal situation for creating an inferiority complex, to which the girl may react by an over-compensation consisting of acquiring masculine ways and habits. This is the 'masculine protest' of the woman, which, Adler thinks, should never have arisen in a civilized society, and which would not arise if men and women were given equal rights and privileges as human beings. Many a psychoanalyst, faced with the repeated occurrence of a certain pattern of breakdown, has finished up by being something of a social reformer, but such questions must not take us too far astray here.

The masculine protest in women may assume a variety of expressions. Frigidity is one of them, for by this means a woman puts an insuperable obstacle in the way of what she regards as subjection to man. A more direct response is to adopt masculine demeanour, dress, and habits. In a woman who does this there are generally in strong evidence other features of an inferiority-complex compensation: unrelenting self-assertion, lack of emotional resilience, neurotic mannerisms, and a general attitude of rebellion. Every neurotic woman, according to Adler, hides a masculine protest.

For the same reason the sexual life of a man may go astray. A man may avoid marriage by any one of a number of unconscious mechanisms—*e.g.*, by neurotic impotence, because his inferiority complex unfits him for the give and take of married partnership, and because he dreads the possibility of subordination. Adler believes that a certain number of homosexual types are also determined in this way.

We have just seen how the psychoanalyst, impressed by the nervous wreckage of our civilization, wishes to remould social life and customs. Adler sees the evil that arises from competitive pride, from individualistic self-assertion, from the eminence of the few and the degradation of the many, creating a social atmosphere which causes each soul to strive ferociously for the only security possible—the security of dominance. When the attempt at domination fails the individual falls into a neurosis or into a state of dull subjection, according to the nature of his temperament and early upbringing. Adler sees salvation for society in a more socialized ethics; in each individual being truly taught that the greatest good lies not in eminence or personal success, but in a merging of one's life with the community. He comes, in a word, to Christianity or Communism.

Freud would draw no such conclusions, for he maintains that the bulk of neurotic troubles arise from repression of sex life in accordance with harsh standards set up by society. Are we to conclude that society must either relinquish these rules or remain beset with the neurotic and the abnormal? Not at all. Society, like an army, must make such moral rules and taboos as are necessary to attaining the group safety or pre-eminence which it desires. His more balanced insight showed him that, although the psychologist may occasionally demand changes in social customs, the neuroses arise, not from the taboos themselves, but from the way the individual adapts himself to them.

The onus lies on each one of us to avoid anti-social behaviour without at the same time using the method of repression. (Unfortunately we get most of our repressions from stupid adults before we are old enough to have any say in the matter.) Let us look a little more closely into repression. We each have a conscience and a sense of self-regard which, with a few exceptions, considers as evil the things which society considers as evil. Even without the policeman round the corner, therefore, the conscious part of us continues and desires to avoid gross sexual and anti-social transgressions. Two courses, however, lie open to us. We may calmly recognize the forbidden impulse when it turns up, realize its inappropriateness, and deny it expression—this is called 'suppression.' On the other hand, we may be shocked beyond bounds, refuse to glance at or recognize the impulse, and hush the whole thing up in the unconscious—this is called 'repression,' and the last state of the individual who practises it is worse than the first.

But now, one may ask, what is to happen to the energy that is suddenly denied outlet by the act of suppression? The mental energy of instincts cannot be destroyed, but only deflected or consumed in internal friction. By seeking some outlet, however, akin to the natural one, yet socially useful instead of reprehensible, we can satisfy the suppressed impulse—this is called 'sublimation.'

Sublimation is a tactful and gradual deflection of instinctive drives to new, socially desirable but personally acceptable goals. We see it in its simplest form when, for example, a young student, instead of endeavouring to kiss and caress the young woman student who excites his interest, discusses with her the problems in which they are both interested. Thereby a new flood of energy is turned on to these intellectual problems, and they acquire a glamour which may never altogether leave them. Part of the sex drive has been sublimated—shunted on to new objects.

Dancing, athletics, scientific curiosity, the care of young children, and even religious devotion constitute more or less remote sublimations for the sexual drive of many people. In the great creative efforts of the artist the sublimation is sometimes so complete that his normal love interests become weak and erratic and his love life a failure.

All the great undertakings of civilization and culture are essentially sublimations. In contemplating this fact we may realize why society maintains its prohibitions of direct instinctive satisfaction with all possible severity—such blind and unreasoning severity, indeed, that sometimes it defeats its own ends. Psychology does not deny morals. It teaches that repressions must be released, to give place, not to primitive instinctive satisfactions, but to sublimations.

We are able to sublimate, to get satisfaction from, ends differing more or less from the primitive ends, because our instincts are more plastic than those of animals. But this plasticity is also the origin of our perversions. The capacity for perversion is the price of the capacity for civilization. The woman who satisfies her maternal instinct by keeping a dozen cats, the person who expresses his self-assertion by trying to sit on top of a flagpole longer than anyone has ever done before, the homosexual, the exhibitionist, the child sucking his thumb—all these are perverts, because the instinctive drive is deflected from its original goal without becoming thereby more useful to society or to the person concerned.

Sometimes the line between sublimation and perversion is difficult to draw. A boy may sublimate his pugnacity into sport, but is it sublimation when the adult continues to express in professional sport the fighting spirit which should be grappling with the social evils of his age? In this speculation psychoanalysis meets social psychology, and both go off in the company of philosophy—to meet us on a later occasion.

CHAPTER IX

THE COMPLETE ARCHITECTURE OF CHARACTER

We have seen how the dramatic rise of the psychoanalytic movement culminated in a variety of contending camps—principally those of Freud, Jung, and Adler. Most British and American psychologists accepted the new ideas with extreme caution, while some flatly refused to accept the conceptions as scientific, the usual statistical and experimental proof not having been given.

Even without external criticism, however, the movement stands suspect. The reader, who has been wondering how much of the last two chapters is accepted science, has rightly asked himself, " Can this be a science, when experts differ so radically in their explanations ? " Actually these chapters contain only the generally accepted basic principles, shorn of the more fanciful developments. And fuller study would make us realize that (except in the minds of their authors) the different explanatory principles are in many instances supplementary, in others, different ways of describing the same process.

Let us not forget that the most reputable of established sciences, like some royal dynasties, have had beginnings about which one does not inquire too closely. Moreover, even science gets strongly coloured by the personalities of those who bear it forward. The strange chapter of psychology which began with Freud's small circle of enthusiastic—nay, fanatical—Viennese followers has borrowed many characteristics of a religious movement. Perhaps we may cease to be altogether surprised at this when we realize that Freud, Adler, and all their outstanding disciples are Jews.

Blood will out. The genius of the Jew has given most to the world in the emotional and mystical realm of religion.

Freud's discoveries have been made insightfully and propounded dogmatically from time to time with a minimum of scientific evidence. He goes up into the mountains, and comes back with graven tablets of stone. His followers accept these commandments fervently, and make of his original writings something in the nature of a Bible. Glance at the tenor of his writings. "Every trend in research which recognizes these two facts [dogma] is entitled to the name of 'psychoanalysis.'" Or, again, "We can regard as correct psychoanalysis only those analytical inquiries . . . which find the cause of neurosis in sexual experiences of early childhood"—*i.e.*, as the high priest originally dictated. There shall be no other gods! Here is the spirit of the Semite, of the Arab, following the inner mystic light—not like the European infidel, irreverently thrusting brute facts in the path of a beautiful theory.

Freud's Viennese disciples took vows to protect his doctrine against all dangers—even the danger of scientific investigation. They became a Church, excommunicating those who, like Adler, had dared to question the fundamental tenets. This is no science: it is a farrago of science and fairy-stories, from which, however, the true scientist will not disdain to fish out the good morsels.

The attitude of the more open-minded scientists has been that of the rather dejected small boy by the river's bank who, being asked by a gentleman for what he was fishing, replied, "Snigglers." "But what are snigglers?" inquired the gentleman. "How should I know?" replied the boy. "I haven't caught one yet."

These fanatics who go out groping into the desert sometimes find a kingdom which the more staid scientist would never have found for himself. They open up realms of thought which they themselves are too wayward to develop patiently. Beneath the undisciplined speculations, the impatient assertions, and the mystically elaborate theories of the psychoanalysts lie a few great discoveries, which scientists may verify and use as a foundation for steady, experimental advance.

The very violence with which psychoanalytic theories have been championed and persecuted shows that somehow these irresponsible speculators have tapped deep springs of human conduct. And superficiality was the curse of the former psychology. There can be no doubt that these pioneers of the consulting-room have got to the very roots of human nature, and played with forces in that obscure Plutonic darkness at the risk of being blasted body and soul. More than one psychoanalyst has been shot dead by some half-insane patient whose tangled life forces he was trying to set aright. Others have completely lost their mental bearings in this world of strange values, and groped about bemused, to the taunt of the unimaginative multitude "Physician, heal thyself." Silberer, Schrötter, Tausk, Weininger—members of the inner circle of psychoanalysts—gazed too long on the horrors of mental deformity and took their own lives. It was a stormy sea that these pioneers traversed to open up the new land of self-knowledge.

Somehow this new knowledge had to be assimilated and the gold separated from the dross. The first decisive step was made by McDougall. We have already seen how, from the biological standpoint, he arrived at an understanding of the instincts vastly superior to the partial conceptions of the psychoanalysts. One might say that Freud discovered the sex instinct, Adler the self-assertive instinct, but that McDougall discovered all the instincts.

At a later stage, it is true, Freud came to recognize two instincts—the libido, or sex instinct, comprising what we know as the mating instinct, the parental instinct, and the herd instinct, and, on the other hand, the ego instinct, comprising self-assertion and submission, pugnacity, fear, etc. Such a twofold division, however, is philosophical rather than psychological. For although we may know that some instincts are especially designed to save the animal's own skin while others are to preserve his species, they are to the animal all alike simple impulses to action.

The animal, like some savages, has no idea, for example, of the ultimate aim of the sexual impulse. The actions, as McDougall has said, are purposive, not purposeful. That is to say, they have a biological purpose, but the creature does not know that purpose while following the immediate impulse. To lump together all the race-preserving instincts in one group and all the self-preserving in another, as if they were bound by some psychological kinship, is, therefore, entirely misleading.

McDougall's keener analysis of the true meaning of an instinct and of the separate instincts with which we are endowed at once resolved the difficulties we have in accepting both Freud and Adler. We perceive the elements of truth in both. A neurosis may arise by the repression of any instinct—self-assertion, sex, fear, appeal, etc.—or by the fixation of any instinct at an infantile level.

Fortunately, McDougall did not stop there. He wanted to give a coherent scientific account of character—of how it comes about that we ever behave like civilized adults instead of remaining like brute beasts, at the beck and call of every instinct with which we are supplied. In the end he succeeded not only in arriving at a workable theory of character to replace the chaotic speculations that had confused thought up till that time, but also in supplying clearer and more convincing mechanisms for the Freudian 'ego instinct' (which is not an instinct at all), the repressing 'censor,' and other psychoanalytic conceptions in the field of abnormal psychology.

The new conceptions with which we have to deal are some of the most abstruse in psychology—precisely because human character is one of the most complex problems that man may study. But the fundamental notion—that of the 'sentiments'—is relatively simple.

To grasp the notion of the sentiment (which, by the way, must not be confused with the popular use of the term, any more than with the schoolboy's definition of it as "the mud brought down by a river") we must first hark back to the conditioned reflex.

We have seen how, owing to certain tracts laid down in the nervous system when we were born, we react automatically to certain things—*e.g.*, to a threatened blow by blinking, to a sudden sound by a start of fear. If a new stimulus is given a few times along with the old, the reflex is 'conditioned.' The nervous system becomes changed so that we now react to the new stimulus. Thus, through experience, we come to react to all sorts of new stimuli.

Our original instinctive nature gets modified by an analogous if not identical process. We begin by reacting to one or two age-old situations, just like the animals, but soon, owing to the greater plasticity of our nervous system, we come to give the reaction to new items that have presented themselves to us in association with the original ones.

Animals and birds do this to some extent, as when rooks, after being frightened by the reports of a shot-gun, fly off at the sight of a man with any stick-like object, or a dog, after being kicked by a man with a bowler hat, bites the next visitor who turns up in that obnoxious headgear. In man the process goes a thousand times farther, and the infant who begins life by reacting fearfully to only one situation finishes by being apprehensive about debts and dyspepsia, disarmament and the Derby.

Note that change of word—from 'fearful' to 'apprehensive'—for it points the way to our next discovery. There has been a change of quality in the feeling. And the moment we pause to think on that we realize that the fourteen primitive instinctive emotions are not nearly enough to account for that rich gamut of feelings—from remorse to reverence—which occupies the mind of the civilized adult.

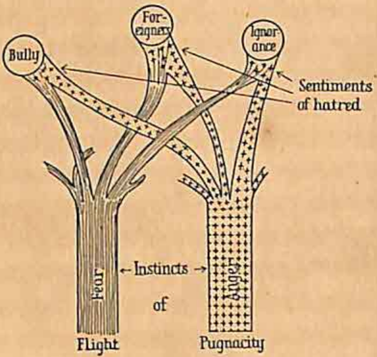
The key to these changes will be evident from a simple behaviour situation. A boy finds a bigger boy destroying his property. The smaller boy's instinct of pugnacity is aroused. He flies into a rage and attacks the big boy. The latter thrashes him. The smaller boy's primitive reaction of fear and escape is aroused. When next he meets the bully his feelings are a blend of the two primitive emotions—fear and anger. A sentiment of hatred has been built up towards the big boy: a more complex, derived emotion—hate—has come into being.

Note that fear alone or anger alone, however much repeated in regard to that object, would not form a sentiment of hatred. A woman may fear thunder, a savage may fear his gods, but if anger does not develop through some new feature of the situation there is no hatred. On the other hand, a father may be frequently angry with his children, but because there is no fear he does not come to hate them.

Thus arise most of the complex emotions of our lives, and with them the complex ways of acting—delicate compromises between two or three instinctive reactions—which distinguish our conduct from that of the animal and the untutored savage. These new habits built up in the nervous system are called 'sentiments' (not, let it be repeated, to be confounded with the popular meaning). Just as the artist can build up from three primary colours an unlimited number of new tints, so we, from our fourteen or more primary instincts, can construct a tremendous hierarchy of sentiments, which may, in the end, almost obliterate the original instinctive behaviour.

A man's character is largely the story of the particular sentiments that he happens to have formed. Remember that a sentiment is not merely a feeling—a blended emotion—but also a tendency to act towards a certain object always in a characteristic and definite way, a way which satisfies all the various instinctive drives concerned.

It is a fascinating exercise to resolve into their instinctive components those complex feelings—admiration, envy, scorn, pity, wonder, shame, jealousy, reverence—which form the softened, stable colour-blends covering the greater part of the picture of civilized life.



The Formation of Sentiments, illustrated by a Simple Sentiment involving only Two Instincts

Thus, scorn is a combination of disgust and anger, as loathing is of disgust and fear. Frequently there is an element of positive self-feeling in scorn, but if this reaches any proportions—if the person is struck by the moral, intellectual, or physical littleness of the other—a new feeling, contempt, is born. In this anger has no place, since the object is too insignificant to be obstructive and arouse the combative instinct.

In admiration we have a blend of wonder (emotion arising from the instinct of curiosity) and negative self-feeling (instinct of self-submission). The latter, it should be noted, is not intrinsically an unpleasant emotion. It is only the vacillation between self-assertion and self-submission—creating the feeling of embarrassment—which is unpleasant. The person or object admired impresses us with such power, cleverness, and beauty that we willingly abase ourselves in submissive worship. Rarely is the self-submissive instinct seen to better advantage than in a dog approaching an irate master or some animal much more formidable than itself.

The combination of this with wonder produces admiration, and our behaviour evidences the presence of both instincts. We approach and gaze searchingly at the admired object, but stop short of full exploration, because the instinct of self-abasement urges us to prostrate ourselves in humility.

Suppose now that the thing evoking our admiration —say a fine building, a magnificent battleship, or a tremendous thunderstorm—has at the same time certain threatening or eerie features which are calculated to inspire fear. The tendency to approach, present in admiration owing to the element of curiosity, is now somewhat more than offset by the tendency to withdraw, owing to the fear element. A new derived emotion is formed, involving three primary instincts—curiosity, self-submission, and fear. Our admiration, because of the terrifying aspect of the thunderstorm, is turned to awe. Mingle with this feeling of awe the feeling of gratitude, as before some benevolent god, and you have the new derived emotion of reverence. This is exceedingly complex, for gratitude is itself a derived emotion, compounded of negative self-feeling towards the benefactor and the tender emotion (of the parental-protective instinct) excited sympathetically and reciprocally by the tender kindness bestowed on us by the giver of good things.

McDougall has argued that because the self-submissive instinct is primarily excited by persons, not things (its biological object is to make us susceptible to leadership), we tend to imagine a person behind the material objects which excite complex feelings containing self-abasement. We think of an angry god behind the thunderstorm and of a creator beyond the stars.

The above are but a few of the feelings accompanying the manifold sentiments that we form for the objects of our world, but the analysis shows how even the most elusive and subtle attitudes of a complex intellectual life can be resolved into the simple, primitive, instinctive stuff which our minds share with those of animals.

Throughout our lives we go on acquiring these sentiments towards persons, things, institutions, and ideas. When we have established sufficiently powerful attachments to ensure that our conduct shall never again be at the mercy of anarchic, individual, unorganized instincts our character is said to be formed. Sentiment formation stabilizes behaviour in two ways: firstly, the strength of the purely instinctive drives is weakened through part of their energy being bound up and invested in various sentiments; secondly, the instincts no longer act in isolation, and are modified and made more discriminating by the prevalence of joint functioning. Anarchy has given way to co-operation and representative government. The organism is not swept along now by this instinct, now by that, but is managed by a committee of instincts.

And when we know what things a man reverences, what things he scorns, loves, hates, and admires, his conduct has become to some extent predictable, in that we know he may be depended upon to do certain things in certain situations. He is reliable. Being no longer at the beck and call of every passing instinctive stimulation, he is a person esteemed in responsible positions, and sought after in difficulties. He is preferred by society, for just the same reason that a punctual railway train is preferred to a bus which may go anywhere at any time, according to the driver's whim—providing, of course, that the train is going in the right direction: for a man may be reliable—*i.e.*, have stable sentiments—in a criminal direction.

If the sentiment structures are so important we may well inquire as to the principal ways in which they come to be built up. Firstly, by historical accidents in the lives of each one of us. By the chance excitation of two or more instincts when contemplating some object we may acquire a new sentiment towards it, just like the conditioning which caused Watson's infant to acquire an obstinate dislike for furry things.

GROWTH OF CONDITIONED REFLEX	GROWTH OF SENTIMENT
A—>B reflex A and C—>B reflex C—>B conditioned reflex	A—>B instinct (fear) A—>C instinct (anger) A—>(B + C) sentiment (hatred)

By such a process the small boy in our example acquired his sentiment of hatred for the bully.

A minority, a very small minority, of our sentiments are acquired through detached reasoning. I see a bonny, attractive child sicken and die. I experience fear of this implacable power, and anger too, for I realize that had the mother been less ignorant the whole thing might have been prevented. I reason that the mother is not wholly to blame, that, had her schooling been more adequate and included a sound training in hygiene, matters would have taken a different course. My fear and anger by logical analysis centre upon this element of the situation: I acquire a sentiment of hatred towards ignorance. My attitude and conduct on all future occasions when ignorance is concerned—*e.g.*, in voting on educational expenditure, in using my own leisure—reveal new features, which will be regarded by outsiders as part of my character.

But the majority of our sentiments are acquired in a less conscious manner—by suggestion and imitation. To appreciate properly the mechanism of suggestion we must turn our attention on one instinct—the herd instinct—which plays quite a unique part in the shaping of character.

The herd instinct is a special nervous mechanism evolved to preserve species of animals under the particular conditions that arise from going about in herds. Here two things are essential to survival: (1) that all should keep together, never straying far from their own kind; (2) that any mode of reaction adopted by one creature—*e.g.*, fighting or running away—should be adopted by all, in order that a united front may be presented. The animals have to behave as if they were sufficiently intelligent to appreciate that unity is strength. The herd impulse, as we inherit it, has two drives corresponding to these two needs: (1) An impulse to foregather with our kind and to experience a vaguely distressful emotion—loneliness—when isolated. (Observe the acute panic and distress of a chick separated from the rest of the brood, and how avidly it buries itself in the middle of the group as soon as it gets back. The excessive growth of our cities—exceeding economic and hygienic demands—is largely due to the unchecked operation of this trend in the herd instinct.) (2) A tendency to take on automatically (and unconsciously) the emotional expressions (and accompanying behaviour) manifested in the voice, gestures, and aspect of people around us. A person speaking in an anxious, nervous manner rapidly causes his hearers to acquire an anxious, nervous feeling. A crying child will set the whole nursery in tears, although his companions may have no idea as to why he is crying. Laughter and anger are equally infectious. This second aspect of the herd instinct McDougall has aptly called "primitive passive sympathy."

From earliest childhood we are acquiring sentiments in an unreasoning way, through the action of primitive passive sympathy. The child fears thunder because the mother has evidenced fear of it while holding him in her arms. As a boy he scorns girlish virtues, foreigners, learning, and physical caution, because his fellows portray scorn of these things. Some of the most deeply rooted sentiments are acquired in this way.

A great deal of 'suggestion of ideas' is really suggestion of feeling (herd instinct). We accept the idea because we have already accepted the feeling. I believe that such and such a political notion is iniquitous because I have already joined with my friends in group indignation at some of its consequences or associations.

We do, however, respond to suggestion of ideas alone—*i.e.*, we accept ideas with conviction without adequate grounds for doing so, providing the ideas find the weak spot in our logical armour. What is that weak spot? It is the first-mentioned aspect of the herd instinct. The rich development of our imagination makes us sensitive not only to loneliness in the physical sense, but to spiritual loneliness too. We find it intolerable to entertain many ideas (and ideas are latent actions) differing radically from those accepted by all normal people. Long before society persecutes the outsider he has had to fight hard against the urge of his innate herd instinct, persuading him to fall in comfortably with what is done. Consequently, an idea which emanates from the herd to which we belong bears the stamp of the imperative, and we tend to accept it unquestioningly. That is the root of suggestion and of hypnotism.

Freud has argued that the authority behind suggestion, to which our critical faculty bows, is not the herd, but the father, head of the family, old man of the primordial tribe, In hypnotism, when suggestion is most potent, the hypnotizer stands to the subject in the authoritative position of the father. In early childhood we are so impressed by the power of the father that we accept uncritically all that he tells us. Any institution in later life—the school, the Church, society, civil authority—which assumes the position of a father to us is able, *ipso facto*, to make us suggestible to its ideas. The divergence of Freud and McDougall here is not so great as it would appear. In childhood the parents constitute the child's 'society'—herd authority takes the form of parent authority. In adult life, consequently, we are suggestible to anything which plays the part either of parent or of the herd in our emotional life. The credulity with which we swallow suggestions presented in print, when we would never accept the same ideas in handwriting, is due to the fact that print bears the stamp of the public mind, of the herd approval, while handwriting is individual.

To return to our sheep. The herd instinct is unique among instincts, because it can function as a powerful lever, bending the other instincts into sentiment structures and shaping the rough clay of our primitive natures into the finished form demanded by the society in which we live. Most of our sentiments—those permanent structures into which character acts—are fashioned by the suggestion of parent, school, club, and Press.

Consider, as an example, the sentiment of patriotism, even though it is not quite so fashionable a piece of mental furniture as it used to be. The component instinctive drives may be easily detected. Listen to the poet:

> Where shall the watchful Sun,
> England, my England,
> Match the master-work you've done,
> England, my own?

. . . . .

> They call you proud and hard,
> England, my England :
> You with worlds to watch and ward,
> England, my own ! [1]

Self-assertion, pride in eminence and accomplishment, is first here. The protective-parental impulse is also concerned, particularly in an older man, thinking of his country's helpless children. There is, too, the excitement of the possessive instinct, of fear for national safety, of indignation at insults, of willing self-abasement before admired leaders. There are other, minor instincts concerned too, to say nothing of the deep satisfaction of the herd instinct through the sense of group solidarity.

This is, indeed, a complicated sentiment, and one directed to an abstract notion—the nation. How can a sentiment of such complexity ever come to be one of the most powerful and strongly welded? Mainly through strong herd suggestion in the desired direction; through the denial of instinctive satisfaction in undesired directions; and through the use of concrete symbols—flag, king, the image of Britannia—to replace, in simpler minds, the abstract notion.

Unbridled individual self-assertion is heavily frowned upon, but the same urge is permitted the freest expression if linked to national causes. Similarly, a man will permit himself to be acquisitive for the nation in a way that he would deny to himself. The denial of simpler outlets to instincts is accompanied by the strongest group suggestion in school, street, and Press. The child waves his flag, and is moved by the thunderous cheers of the crowd around him; he reads in print of heroes of patriotic endeavour; and in adult life the newspapers carefully prepare for him the sensation of waxing indignant, fond, proud, or possessive with his millions of fellows over the beloved nation.

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[1] *England*, by W. E. Henley.

As a result of this painstaking education he responds, when the blast of war blows in his ears, not to the primitive animal calls of personal fear, rage, and self-assertion, but to the need for disciplined action, patience, self-sacrifice, and persistent work towards a common goal.

If we would study a sentiment of the utmost architectural complexity we may turn to that which binds the lover to the loved one. For this powerful source of thought and action, the theme of countless poets and dramatists, the building up of which may make a character and the destruction of which can shatter a life, is no mere instinct. The sexual instinct alone would suffer all the vagaries of appetite, and change with the changing sexual attractiveness of the object.

Yet our greatest poet reminds us:

> Love is not love
> Which alters when it alteration finds.
> . . . It is an ever-fixed mark
> That looks on tempests and is never shaken; . . .
> Love's not Time's fool, though rosy lips and cheeks
> Within his bending sickle's compass come; . . .
> If this be error and upon me proved,
> I never writ, nor no man ever loved.[1]

Undoubtedly the most powerful component is the sexual instinct, with its emotion of lust and its stimulus of 'sex-appeal'—that peculiar blend of health and feminine charm. But there is also the tender, protective emotion of the parental instinct, called out by the childlike qualities in a woman (qualities attractive while wooing, but exasperating in the management of a home). There is the powerful gregarious instinct, in so far as companionship is felt and the lovers save each other from loneliness. There is self-assertion, when the lover proudly shows off the or 'bad' behaviour are established in him by reward and punishment, by affection and the deprivation of affection, following his actions. But he cannot be said to have either a will or a conscience.

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[1] Sonnet CXVI.

Soon after he begins to speak he acquires an idea of himself, just as he does of his brother Tommy, as a little boy, called John, of a certain age and appearance, with particular excellences and disabilities, much loved by his mother, stronger than Billy Green and better-looking than Jimmy Jones. He hears his name mentioned, is sensitive to the praise or blame showered upon him by those in authority, and his mind is constantly at work shaping an image of himself in accordance with these demands—if it is not obviously beyond his powers to meet them.

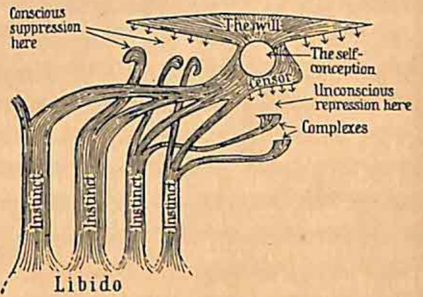
As he grows into boyhood he has fits of admiration for various people who swim into the orbit of his life—his sailor uncle, for instance, or the young gallant who drives a racing car—and for a while his self-conception is modelled exclusively on each of these. The world of books presents him with a greater range of powerful and noble characters which excite his hero-worship.

At first there may be much fantasy and self-deception in this ego conception, but in time the cruder features fall away, leaving a picture a little better than, but reasonably adjusted to, his own physical, intellectual, and emotional potentialities.

Before each wayward instinctive impulse and temptation he pauses long enough for an unconscious (or, in acute circumstances, a conscious) weighing up of the proposed action in the light of his ideal figure. In time he comes to feel, automatically, shame if the action is unworthy; profound satisfaction if it is in keeping. In this way his conduct acquires consistency: his will is being formed; the master sentiment gives him self-control—control of the instincts—and enables him to steer a steady course, in spite of the buffeting of environment and the fierce undercurrents of his own nature.

The will, therefore, is nothing but the self-regarding sentiment in action.

As the self-regarding sentiment develops it organizes within itself all other sentiments. John, grown up, perceives himself as a competent electrician, as a patriot, as a good husband. These sentiments, originally independent growths about outside objects, become linked together by means of the self-regarding sentiment, which becomes the keystone of the arch of object sentiments.



STRUCTURE OF THE SELF-REGARDING SENTIMENT, SHOWING ITS ACTION IN SUPPRESSION AND REPRESSION

Here we must cease following McDougall's wonderful analysis of the architecture of character, for it deals with complexities and subtleties which would require more space than can be given.

With the aid of these conceptions, however, we can now see the psychoanalytic explanations in a new light, can complete them, and remove inconsistencies. The actions, thoughts, and feelings of our waking life are mainly the functioning of sentiments; the chaotic life of the unconscious is the product of instincts and of banished, tumbledown sentiments falling outside the main sentiment structure. The complex, therefore, is less organized and integrated than the sentiment.

What Freud loosely called the 'ego instinct' and the 'censor' are really different aspects of the self-regarding sentiment, the governing, controlling, and repressing power of the mind. Note in passing that 'ego instinct' is inaccurate, because, although the self-assertive instinct is the dominant member of the self-regarding-sentiment committee, even the sexual instinct may find a place there and aid in repressing anarchic forms of the sex instinct.

Now it follows that whatever impairs the structure of the self-regarding sentiment should cause loss of will-power. Is this what we find? Notice, first, that anything which delivers a vital blow at self-respect results in collapse of will-power and a recrudescence of aimless instinctive behaviour. An interesting example is instanced by McDougall. He points out that excessive indulgence in alcohol is said to cause flabbiness of will. Yet a century ago drunkenness was rampant among men who retained the strongest will and character. The explanation is simple: in those days a gentleman could only maintain his self-respect by being carried to bed in his boots six nights out of seven; to-day, owing to a change in the direction of pressure of public opinion, he can only retain his self-respect by avoiding such 'indignities.'

Will-power may be defective also because the sentiment has been shoddily put together from the beginning. Some major instinct has been left out or set in opposition. The child, maybe, has never been allowed to show self-assertion, and that instinct, instead of functioning smoothly in the sentiment with other instincts, comes out crudely and spasmodically in the intervals of being repressed by fear. Or, far more commonly, the child has been taught that all sex manifestations are wicked, and his sexual instinct, from its hiding, keeps up a constant guerrilla warfare with a weakened, incomplete self-regarding sentiment. One day we shall have a science of character which will be applied, with profound rewards, to education.

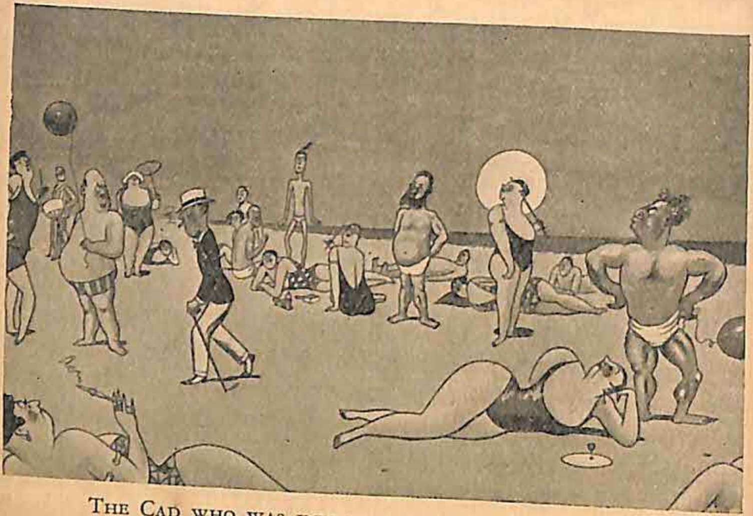
By following up this same line of discovery psychologists have found an intelligible solution to a riddle which has puzzled philosophers and practical men even more than the problem of will—to wit, the enigma of conscience. We all know people who are almost blissfully ignorant of what it is to have a conscience, but for most of us it is a pretty grim reality, which pops up whenever we are about to enjoy ourselves in some forbidden fashion. The theologians, particularly those of the Middle Ages, gave it additional power, in an unruly world by proclaiming it a gift from Heaven. When Luther took this statement seriously, however, and set up conscience in place of the priest, he was regarded by the priesthood as a dangerous lunatic.

Let us note, first of all, that a young child and most animals cannot be said to have a conscience. The infant only refrains from doing what he wants to do if he is promised a more tempting distraction or, alternatively, a smacking. Gradually, owing to the herd instinct working within him, he begins to respond to approval and disapproval written on the faces of those around him. He finds it easier to do what people regard as the accepted thing.

To do the disapproved thing is to feel shunned, to experience that vague mental distress which, as herd animals, we feel in physical or spiritual isolation. This is the extreme punishment of the public schoolboy who does 'what isn't done,' and is sent to Coventry. These associations become stamped into his nervous system, so that even when people are not near he experiences the same pleasure or uneasiness in connexion with various actions.

Because the gregarious instinct is the force behind conscience it is possible to see the beginnings of conscience in a dog, which is a herd animal, but not in a cat, which, although equally intelligent, is a solitary hunter, and has no respect for anything less tangible than a well-aimed half-brick.

Conscience thus comes to be a reflection of public opinion, of society's standards of good and bad. The fact that it never goes beyond these commands by inventing new prohibitions and permissions is sufficient refutation of the belief that it is specially implanted by God. The Christian's conscience (if nothing else) assaults him if he dallies with a woman other than his wife: the Mohammedan's conscience commands him to keep as many women as he can afford. A civilized man is oppressed with guilt at the thought that he may have committed murder: the head-hunter of Borneo is conscience-stricken if he fails to kill as many neighbours as might reasonably have been expected. Even in the same community such inversions may be found, as in the comparatively rare instances of children brought up by criminal parents and taught to feel pangs of conscience if they do not



THE CAD WHO WAS IMPROPERLY DRESSED ON THE LIDO
H. M. Bateman
Illustrating the theory of relativity in conscience formation.
By permission of the artist and "The Tatler"

do a good day's pilfering from the street barrows in the neighbourhood.

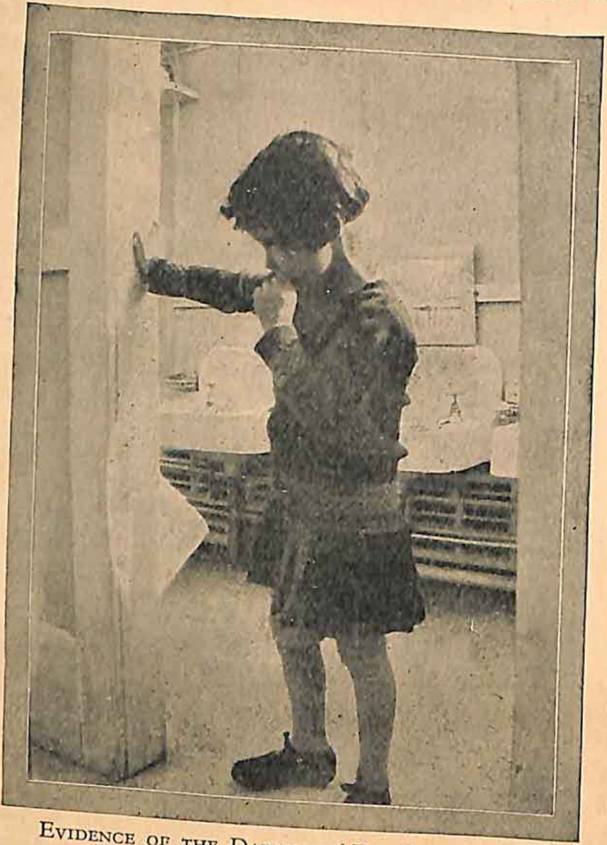
A young woman of Victorian England would have been tortured by her conscience at the thought of going about unclothed, but a Greek or a member of a modern nudist colony would be ashamed at going about in the sunshine attired in Victorian frippery. The conscience in each brain is a replica of the moral ideals upheld in that society at that particular time.

AN EARLY INCIDENT IN THE INTEGRATION OF THE SELF-REGARDING SENTIMENT

A boy registering pride and satisfaction at having washed and changed without help, and in record time.

From "The Social and Emotional Development of the Pre-School Child," by K. B. Bridges. By permission of Messrs Kegan Paul, Trench, Trübner and Co., Ltd.

"What of the exceptions?" the reader will ask. What has happened in the martyr, whose conscience bids him face the hostility of popular opinion and the threat of the stake? How could the herd instinct have fashioned the conscience of Galileo in opposition to all the opinion of his day? Whence does the pacifist conscientious objector



EVIDENCE OF THE DAWNING 'EGO INSTINCT,' OR SELF-REGARDING SENTIMENT

An infant sobbing to herself after a relapse into incontinence.

From "The Social and Emotional Development of the Pre-School Child," by K. B. Bridges. By permission of Messrs Kegan Paul, Trench, Trübner and Co., Ltd.

draw the moral support to oppose the outraged opinion of his countrymen?

Note that the imaginative power of a strong intellect enables a man to call up with impressive realism distant places and times. The martyr thinks nothing of the hostile crowd, but is wrapt in ecstasy at the thought of the welcome he will receive from the heavenly company he is shortly going to join. His conscience, his self-respect, respond to every shade of opinion of that august body. The scientific rationalist, who has no compunction in breaking the commands of his childhood conscience, built up by a previous generation of stupid adults, looks confidently to unborn generations for approval of his eccentric opinions. There is no conscience without the aid of the herd instinct.

Conscience is thus an aspect of the self-regarding sentiment, fashioned under social approval and disapproval, and drawing upon the powerful forces of the herd instinct. It is, in a sense, the highest and most impersonal part of the ego ideal. In the less precise analysis of Freud it is called the 'super ego' which rules the ego, and still more the unconscious, with a rod of iron.

With this clarification of the structure of character and personality, which has brought the clinical observations of psychoanalysis into a connected whole, we are equipped to pass on to the study of abnormalities.

CHAPTER X

THE MIND OUT OF GEAR

"GENIUS is madness," said Lombroso, summing up, in one of the striking phrases he loved so well, the cardinal result of his inquiries. Nietzsche, himself one of the strangest of the great abnormals and doomed to end his days in an asylum, demands of the inert multitude, "Where is the madness with which you should be inoculated?"

Many signposts direct us to the study of the abnormal. One of the most imperative of them is this connexion of instability with genius, for men of genius, although numerically so few, are yet of enormous importance for the progress of civilization.

In the abnormal, too, as we have already pointed out, one frequently finds the clue to the structure of the normal mind—if, indeed, any mind can be said to be a completely normal mind.

From his studies of the borderland between normality and insanity Freud achieved an understanding of the fundamental processes in all minds. And we have seen how he explained certain forms of insanity by his theory of regression of the libido, or general instinctive energy, to infantile levels of attachment. McDougall, following independently a very different path, conceived in the forests of the East Indies his resolution of human motivation into primitive instincts, akin to those of the animal world, and showed how in man they are modified and welded into sentiments corresponding to the needs of civilized life.

The paths of medical man and scientist had converged to agreement on all but inessentials and matters of terminology, except that McDougall maintained the relative separateness of the streams of instinctive energy, whereas Freud was inclined to think that they all sprang from a common fund of libido. Truth probably lies between the two.

Suddenly the scientist, perhaps to the ultimate enrichment of his science, was forced from the logical and ordered sequence of his research plans, by the world convulsion that changed so many plans, and found himself face to face with a terrible problem.

McDougall, with that impulse to adventure which seemed always to be tugging at the ordered pattern of his life, had enlisted soon after the outbreak of war as a private in the French army. From this position of irresponsibility he was quickly recalled to fight, with psychological science, the new problem of shell-shock. Large numbers of men, with all kinds of mental disorder, were streaming back from the battle front.

In struggling with this unprecedented situation much valuable information was gained about abnormal mental conditions—information which confirmed the analyses of the normal character structure. Yet still, even to-day, many abnormal emotional conditions remain obscure. Science there has barely passed the classificatory stage, owing to the absence of support for research by psychologists, and McDougall tells us that he could but feel " like the father of a multitude of helpless children, hopelessly stumbling on the brink of hell."

Among the Canadian casualties alone (for which precise statistics exist) 10 per cent. of the total number were victims of nervous and mental disablement. Only in about 14 per cent. of these was the trouble in any way traceable to direct injury to the head by wounds or concussion. And it was soon evident that external stress and emotional shock of the severest kind were rarely to be held accountable for the graver and incurable forms of mental disorder.

Among these cases, as among those of civil life, all forms of disorder were found. There were abnormalities of a hysterical kind, showing physical symptoms mental in origin. Such conditions were successfully cured in a large number of instances on the formula of Freud, which we have already described. The following instance and other examples to follow are chosen from McDougall's material (*Outlines of Abnormal Psychology* and elsewhere):

> A soldier always suffered, upon attempting to eat, a spasm of the muscles of the jaw and of those concerned in swallowing, a spasm which produced a facial appearance of rage. He had no understanding of the origin of the tic. In hypnosis he relived a forgotten scene: he oversaw, while lying hidden in the enemy's territory, several enemy soldiers maltreating one of his comrades; he was overcome with rage, and at that moment he received a bullet wound and lost consciousness.

The patient, an Austrian soldier, suffered no longer from his distressing symptom when the memory had been integrated into his waking consciousness.

A common neurosis of civil life is the anxiety neurosis, in which the patient is subject to a constant vague feeling of dread, sometimes reaching such acute proportions as to resemble a fit. Freud, in accordance with his belief in the sexual character of the instinct energy, or libido, had interpreted these cases as follows: The patient, usually conscientious, ambitious, and hard-working, has attempted to subliminate his sexual energies to the utmost and to deny himself completely any direct sexual expression. Now, overwork itself never produces a nervous breakdown, but it may impose a strain upon the will in circumstances such as these, which renders increasingly difficult the task of 'bottling up' the sexual energy and using it at high levels. Then, says Freud, the pressure of the libido from within is felt by the ego (self-regarding sentiment) in just the same manner as a continual threat from without would be—*i.e.*, as fear. An anxiety state develops from this inner threat of the sexual libido to the security and supremacy of the ego. Now McDougall showed that these states could also develop directly from the repression of fear experiences. The following is such a case, complicated by the fear issuing from remorse and dread of punishment:

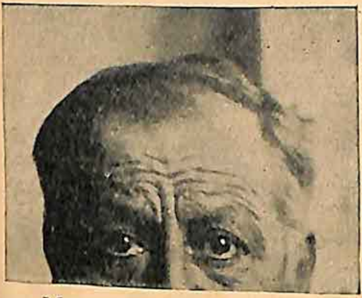
THE INSTINCT OF FEAR AND FLIGHT APPEARED IN ITS PRIMITIVE SIMPLICITY IN MANY WAR SITUATIONS

Witness the above 'retreat' of Russian troops on the Eastern Front. Yet Freud argues that fearful incidents do not give rise to anxiety neuroses.

From "The First World War," by Laurence Stallings. By permission of Messrs Simon and Schuster.

A young soldier, after being buried by a shell explosion, had persistent weakness and tremor of both lower limbs, rendering him incapable of walking. He was very reserved and unsociable; he would spend his time sitting in some retired spot with fixed gaze and melancholy expression.

In the end the following memory was extracted from him:



Melancholiac Wrinkling

This particular expression, as Dr Stoddart first observed, is frequently associated with pathological melancholy.

From "Mind and its Disorders," by W. H. B. Stoddart. By permission of Messrs H. K. Lewis and Co., Ltd.

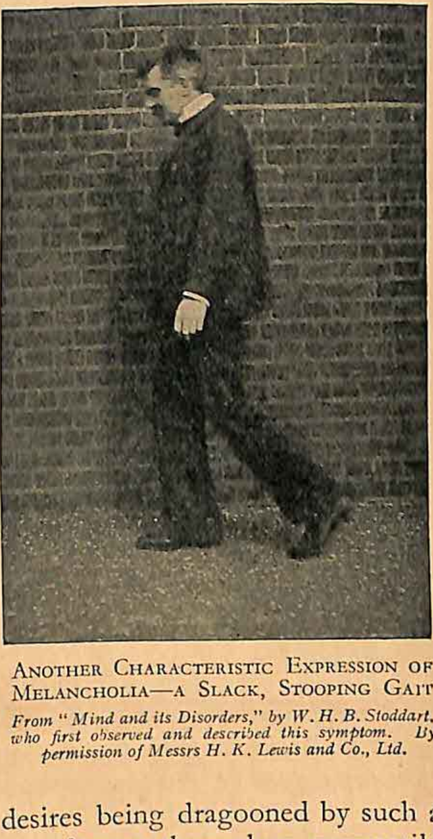
During an advance he had leapt into a trench and found there three of the enemy wounded; in his excitement he bayoneted all three. Ever since his 'knock-out' by the shell, which followed shortly after this incident, he has been oppressed by the memory of his action and by remorseful emotion. When he sits alone he is generally picturing the incident. He sees the pitiful expressions of his victims, and hears the dreadful cry of one of them, uttered as he plunged his bayonet into him. He regards himself as a murderer and rightly liable to punishment. He tries to forget it, but cannot.

When he had been brought to take a more lenient view of his impulsive action, and to realize that no question of punishment could arise, he gradually recovered, after months of illness.

Such a condition is already half-way to true melancholia, a distinct form of insanity to be found in every asylum. The melancholiac remains in a state of chronic sorrow, sometimes tormenting himself with accusations which are quite unfounded.

Freud regards melancholia as being due, in part, like dementia præcox, which we have already discussed (p. 155), to a regression to an earlier, narcissistic centring of the libido upon the self. A discussion of the obscure mechanisms which he has shown to exist in certain patients would take us into deep waters, from which we might not emerge for several chapters—or volumes. McDougall has shown that melancholic states may arise from too highly developed a self-ideal in the self-regarding sentiment.

This development, especially in a person of a naturally aggressive disposition, means that the self-regarding sentiment will persecute, with its too exacting standards, the rest of the personality—particularly the expression of the sexual instinct. If now, in spite of the instinctive desires being dragooned by such a martinet, they break loose and assert themselves, necessarily overthrowing and repressing a part of the self-ideal (or super ego) itself, a state of profound remorse is engendered. The forces of the ego ideal now persecute the rest of the mind with a constant sense of guilt. It is not even necessary that an offence be committed; it suffices for the



ANOTHER CHARACTERISTIC EXPRESSION OF MELANCHOLIA—A SLACK, STOOPING GAIT

From "Mind and its Disorders," by W. H. B. Stoddart, who first observed and described this symptom. By permission of Messrs H. K. Lewis and Co., Ltd.

instinctive and unconscious drives merely to have contemplated quite momentarily some transgression.

In spite of this degree of insight, far less success has yet been obtained with melancholiacs than in the cure of hysterics by the unveiling of complexes.

Obsessions and compulsions, another great class of mental abnormalities, are apparently produced by a mechanism similar to that of melancholia. They are to be found generally in people with a too exacting, ideal and critical self-regarding sentiment (or super ego). McDougall has analysed the following case :

> An officer, X, of high culture and character, was troubled so much by morbid scrupulosity in the performance of his duties that he was sent to hospital. He suffered no other disabilities beyond occasional severe headache and an hallucination which he was loath to reveal.

He had been very strictly and severely brought up. On his first commission he was travelling on a crowded transport which was torpedoed, with shocking results.

> As the ship sank, most of those who remained alive sprang overboard. X remained on deck to the last.

A young officer, already supported by a lifebelt, implored X to give him his (X's) too.

> X refused to do this, and shortly afterwards saved himself by swimming to a boat, which he shared with a raving madman until picked up. The hallucination from which X suffered was a vision of the corpse of the young officer whose unreasonable demand X had refused. The trouble cleared up as soon as X was led to revaluate the incident by facing it and examining it rationally.

Here we see a man of fine character, and with a self-regarding sentiment developed on such lofty lines that it reproached him even for not sacrificing his life to give a brother officer a still better chance of surviving. Fortunately his self-preserving instincts (mainly fear and self-assertion) at the time suppressed, and to some extent repressed, these unduly altruistic demands, with, however, the unfortunate sequel of an obsessive scrupulosity.

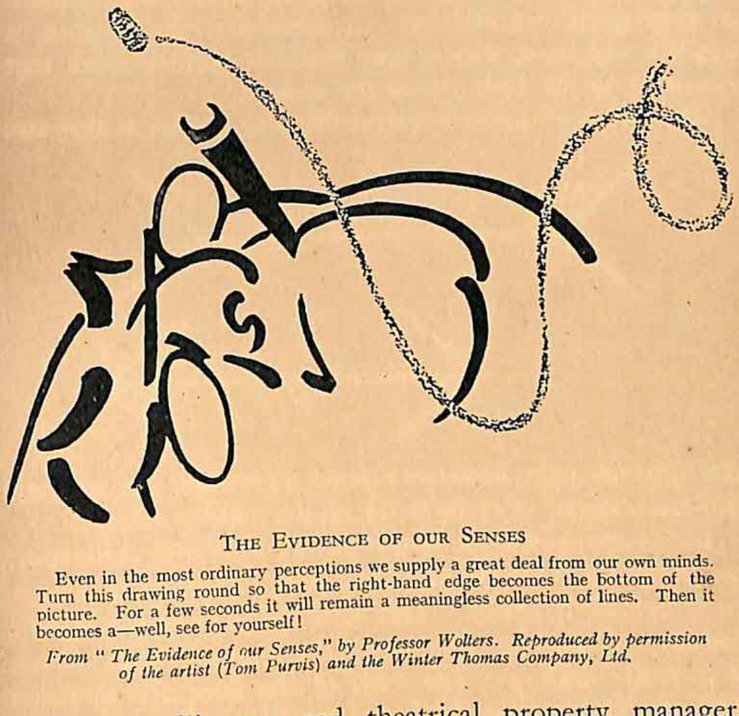
One of the most common forms of insanity is that in which the patient harbours some fixed delusion or hallucination. Indeed, this is the popular conception of madness and the way of describing a person holding ideas different from one's own. In passing we must clear up any confusion which may exist about the meaning of the terms 'delusion,' 'illusion,' and 'hallucination.' A 'delusion' is defined as a system of beliefs, affecting a man's behaviour, which does not fit in with reality. An 'hallucination,' on the other hand, is merely a false sensory experience—hearing voices that are not there or seeing things that do not exist. The term 'illusion' is also restricted to things perceived by the senses, but differs from an hallucination in that there really is something there, although it is misperceived. It is hard to draw a sharp line between illusions and hallucinations, for most hallucinations, in an ultimate analysis, can be said to have some slight stimulus which 'sets them off.'

The provocation may be some physiological process in ear or retina, or some vague and faint external sounds, sights, or smells. The poet Meyer, in the days of his madness, would see pale, whispering ghosts among the flowering reeds by his house, and hear the merry shouts and laughter of dead friends rising out of the waves in the dead of night. Here, although there were physical sensations behind what he saw and heard, one would call the experiences hallucinations rather than illusions. On the other hand, the voices heard by Jeanne d'Arc probably had no such physical substrate, but lived of their own vitality. Similarly with Schumann, who believed that his musical motives came to him from angel voices—indeed, from Schubert and Mendelssohn in the beyond. He would stand the whole day at his writing-table, listening with glances of profound rapture to what they sang to him. Delusions and hallucinations often occur together, as in the present example. Although hallucinations are generally confined to the insane, most normal people can recall one or more hallucinatory experiences, probably occurring on going to bed or just waking up.

All are alike in bearing a false picture of reality, and are alike in origin. Indeed, it is interesting to see how the most trivial illusions are produced by precisely the same mechanism as that which occasions the most staggering delusions of the insane.

We are expecting a friend to call at any moment. Suddenly we hear the characteristic tones of his voice speaking to some one at the gate, followed by the sound of his footsteps on the path. There is no one there—only two strangers talking in the road. Our eager expectancy has deceived us. A young man waits for his sweetbeart at the appointed *café*. He sees her a dozen times befere she actually appeans. In the last two sentences there are three spelling mistakes, which may have been read as correct by the reader. The correct beginnings of the words create the expectancy of a certain end, and we see letters that do not exist. Such expectancy is associated with mild desire, so that these illusions are in principle not different from those fantastic hallucinations of lascivious women which pursued St Anthony even into the desert. He believed they were sent expressly by the devil, but in truth they arose from the repressed sexual instinct in his own unconscious.

In the above instances we falsely perceive something which we anticipate or desire. As a matter of fact it can easily be shown that, even in ordinary circumstances, we always read more into our perceptions than is actually given. A few sense impressions, as leading cues, are all that the eye or ear bothers to register. The rest we fill in from memory, knowing what to expect.



THE EVIDENCE OF OUR SENSES

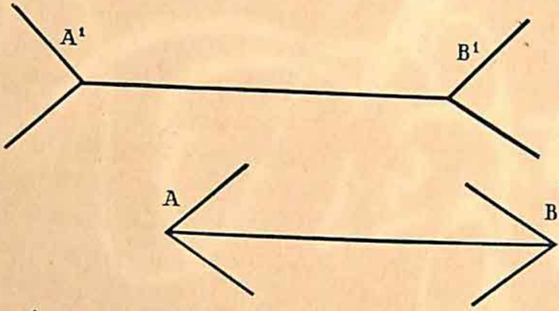
Even in the most ordinary perceptions we supply a great deal from our own minds. Turn this drawing round so that the right-band edge becomes the bottom of the picture. For a few seconds it will remain a meaningless collection of lines. Then it becomes a—well, see for yourself!

From "The Evidence of our Senses," by Professor Wolters. Reproduced by permission of the artist (Tom Purvis) and the Winter Thomas Company, Ltd.

Memory, like a good theatrical property manager, quickly recognizes the characters, and robes them in their appropriate costumes. If certain ideas and images have recently been used, if the nerve cells concerned are still faintly excited, they are especially prone to be used again—even inappropriately. After the ghost-story every white gatepost seen through the gloom has hollow eyes and waving arms.

Few people realize how wildly inaccurate a great deal of evidence from the witness-box is on account of this tendency of the mind to fill in the blanks without telling us where it has done so. But if the witness harboured any wish or expectation at the time of the incident the error is enormously increased, be he never so honest with himself in subsequent recollection. A scandal-loving woman, a prudish old man, sees a very different picture from that recorded by the little eye of the camera.

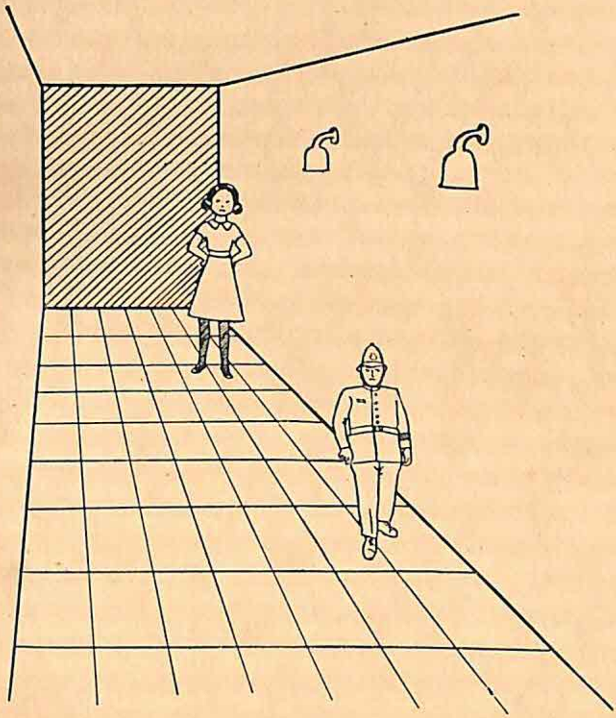
The two well-known optical illusions shown at this and the opposite page illustrate certain interesting but less important sources of error to which the mind is subject.



In the above example (known as the Müller-Lyer illusion) we judge the line with outgoing ends (*A^1B^1*) to be longer (it is actually shorter). This error arises from the mind's inability to analyse adequately the features with which it is really dealing. The ends of the lines are confused with the ends of the figures as a whole, which are more widely separated in the outgoing than in the ingoing figure.

In the diagram at p. 205 we have the illusion that the figure of the policeman is smaller than that of the little girl; whereas, in fact, it is slightly taller. Here the eye is led to expect, from the perspective of the corridor, that the figure of the policeman will be much bigger. Finding it relatively smaller, we judge that it is actually smaller.

This illusion of contrast is also fairly widespread. It occurs again in what is known as the size-weight illusion. Take a very large object and a very small object of the same actual weight. A large empty chocolate-box and a lump of lead or a brass weight will do. Ask some one to say which is heavier and by how much. He will almost invariably say that the small weight or lump of lead is heavier by several ounces. Here the same weakness of the mind comes to the fore. Expecting the much larger object to be much heavier, we are surprised to find it practically the same. We judge its relative lightness to be actual lightness. The contempt which some people acquire for celebrities when



they meet them in the flesh is similarly produced. Finding the great man to be decidedly human in most things, the worshipper confuses his impression of relative smallness with one of actual smallness, and noises abroad his discovery of the littleness of the great.

Some of the greatest of life's illusions arise from the same tendencies as appear in these simple experiments. This confusion of relative with absolute accounts for the common illusion that the men whom we knew when we were boys are finer and grander than those alive to-day—the 'decadence' or 'mighty-ancestor' illusion.

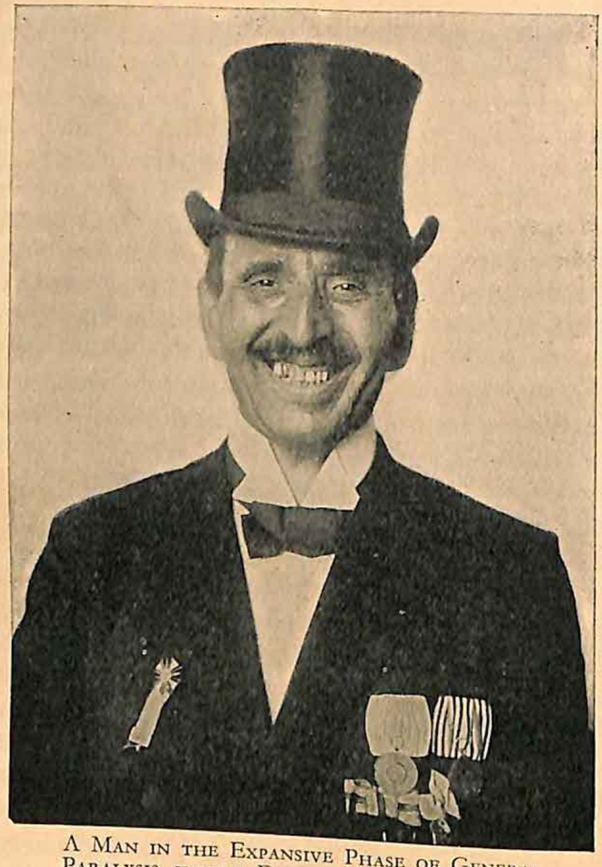
The failure-of-analysis tendency, of the Müller-Lyer illusion, accounts for such things as the greater attractiveness of a girl when seen in a bevy of beauties than when seen in isolation. A man who falls in love at first sight with a girl in a chorus may find that somehow he has credited her with the face of the best-looking girl, the voice belonging to the best singer, and the legs of the most shapely—without, of course, being aware of such detailed judgments. Similarly a girl who falls in love with a man on holiday may unconsciously be expecting to marry a holiday along with the man. And when we assert that human mentality has progressed during historical times are we not under an illusion, due to our inability to distinguish real mental capacity from the apparent capacity conferred by culture borrowing and education?

Illusions of these kinds, however (intellectual in origin), are by no means so powerful or important as the wish fulfilment and emotional causes previously discussed. It is these latter which pass without a break into the delusions of the insane, and provide us with a first clue to the mechanism of insanity. Let us consider a fairly typical instance among those studied by McDougall:

> A middle-aged artisan of good antecedents was sent to France with a labour battalion. There it became his duty

> to take part in guarding an immense dump of ammunition. One night a German aeroplane dropped a bomb on this dump, starting a fire and a series of explosions, which continued until the dump was wholly destroyed. My patient, as he told me, ran at once to the locomotive of a train laden with shells that stood alongside the dump, with the intention of drawing the train out of danger. When he reached the engine he found in possession another man, who told him he was not wanted, and who drove the train away. Shortly after this incident he was sent to hospital as a mild shell-shock case, and some weeks later came under my care. . . . He complained of accusing voices, and displayed a mild delusion of persecution. I suspected that he was concealing the history of some dereliction of duty, or failure of some more real and serious kind than that which he detailed to me. But I failed to elicit any such admission. After failing to obtain any lasting improvement during some weeks I secured his return to civil life, and heard after some months that his condition remained unchanged.

Among all forms of insanity, ' paranoia '—the technical term for this state of entertaining systematized delusions—is one of the most difficult to cure. Because the patient is well controlled, clear in his mind, and perfectly sane in all matters not touching his delusion it is hard to believe that he cannot be persuaded of his false position by reasoned argument. One quickly realizes, too, that high intelligence brings no immunity from such delusions. Rousseau, whose intellect supplied the principles behind the French Revolution and ushered in a new and broader social life, suffered from the delusion that people were spying on him, following him about, trying to poison him. Without reason he fled from one retreat to another, but could find no sanctuary from his own suspicions. What has gone wrong in such a mind ? Surely he cannot have harboured a wish to be persecuted ! Now it is significant that the majority of paranoiacs suffer from delusions of grandeur (megalomania) or of persecution or both. A washerwoman



A Man in the Expansive Phase of General Paralysis, having Delusions of Exaggerated Self-importance

From "Handbuch der Geisteskrankheiten." By permission of Verlagsbuchhandlung Julius Springer.

believes that she is the queen of England. To fit this in reasonably with her actual station she believes in a widespread and cunning conspiracy on the part of her enemies to keep her true importance unknown. Persecution and megalomania are opposite sides of the same coin.

Delusions founded on jealousy or on the sexual drives are also known, but even in these an element of persecution is fairly common—*e.g.*, a woman believes herself to be persecuted by the amatory attentions of many men. Thus one can point in each instance to one of the greater instinctive drives which is achieving no satisfaction in ordinary life, and which creates gradually a system of ideas to redress the balance between desire and reality. Because they are so necessary to the psychic life these ideas are accepted with unshakable conviction.

Owing to the possibility of symbolism and other disguises, however, it is not always possible to pick out at once the underlying causes of the more bizarre and fantastic delusions.

Consider the following case, cited by Devine:

> Shortly after his marriage a man, aged thirty-nine, developed a severe anxiety state. He walked about in a state of restless agitation, picked himself, and could not concentrate. After a time the curious delusion emerged that he had the gift of flight. His general intelligence and memory continued unimpaired, and he was able to converse sensibly, and even wittily, upon any subject within the range of his knowledge and experience. He never seemed really interested in a conversation, however, and he gave the impression that he found it rather a nuisance, as if he had more important and pressing matters awaiting attention. The moment the conversation flagged the patient muttered to himself, cursed himself for a fool, and exhibited a number of jerky movements which betrayed an obvious difficulty in sitting still. He led a solitary life, and liked to hide himself in some quiet spot, where he was free to indulge in a number of strange antics without the restraint or hindrance which the society of others imposed. He poised himself for flight, inflated his

chest, made all kinds of hissing noises, and persistently reproached himself for not soaring into the air.

What is the symbolism here? It becomes a little clearer when we discover that the sexual life of the man had suffered such regression to infantile levels that normal married life could not be anything but a burden to him. Flight symbolizes an escape from the situation. It may be an 'over-determined' symbol. Freud regards the flying dream as a symbol of sexual virility. In other instances it is a clear expression of self-assertion—of soaring over others. The desires for escape, for virility, and for successful self-assertion, therefore, find expression in the man's belief that it is possible for him to fly without mechanical aids.

Although we have detected the wish-fulfilment mechanism in delusion, we have still left half the riddle unsolved. Why do thwarted desires lead to delusions in some people and not in others? Certain psychological types, distinguishable by a special temperament, are known to be more liable than others to delusion. With this question of psychological types we shall deal in the next chapter. But in some degree and in minor matters we all

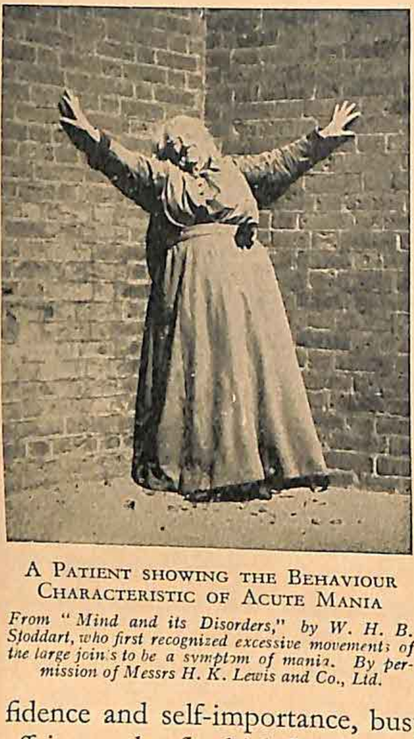
> Shatter this sorry scheme of things entire,
> And mould it nearer to the heart's desire.

Who shall say where delusion ends and true knowledge begins? The greatest philosophers, peering more closely at the light of knowledge, have been forced to the conclusion that we can be certain of far fewer things than the average man imagines. We all live to some extent on delusions. Freud, afflicted with philosophical leanings in his old age, like many a scientist, has pointed out that the widespread religious delusion of human immortality is obviously a desire fulfilment of all our instincts. The belief in a personal God, he argues, could also be predicted as a delusive outcome of the father complex rooted in the unconscious. The father before whom we stood in awe in early childhood also, in his omnipotence, shielded us from all harm. We desire to escape the ultimate responsibility of adulthood. In dangers and uncertainties our unconscious longs for the world of childhood. We project this desire, says Freud, into the delusion of the existence of a god.

The psychologist, however, can only point to a mechanism which might produce an illusion. He is no more competent than anyone else to say whether a delusion actually exists. Like a scientist travelling with an explorer in the desert, he can say whether conditions exist to create a mirage, but he cannot say whether or not, in addition to and behind the mirage, an actual oasis exists. We tread closely on profound issues. Are we happier keeping our pleasant illusions than we should be if we threw them away? It may seem indispensable to a nation's self-respect and happiness to believe itself vastly superior to other nations, but if this leads to war with a nation which is in fact more powerful the resulting misery may well outweigh the initial satisfaction from the delusive belief. Such a double aspect exists for every delusion.

Some of the greatest delusions are those which are most widespread, for the herd instinct comes as a powerful support to the individual wishes concerned and removes self-critical notions. From the same political facts the conservative, the liberal, and the socialist construct quite different systems of beliefs, the group spirit of each aiding the systematization of its delusion. For all cannot be right. Numbers, moreover, are no guide to truth. In one instance, at least, when Galileo had the weird notion that the earth moves, one man saw truth and the whole world cherished a delusion.

Another form of abnormality, very different from the above, yet having close associations with normal processes, is that known as 'manic-depressive' insanity. At the beginning of this century a German psychologist observed that 'mania'—a state of excitement and unbridled self-assertion—and 'melancholia'—a state of profound depression and exhaustion—were in reality not two diseases, but one. Careful records showed that these states could be regarded as alternating phases in one and the same disorder process. In a number of instances it was found possible even to predict with fair accuracy the periodic return of these phases.



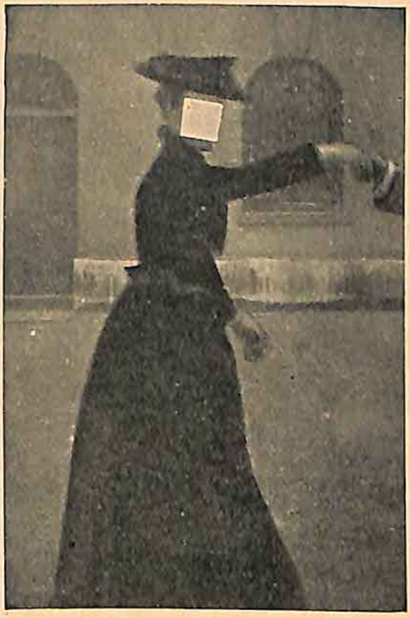
A Patient showing the Behaviour Characteristic of Acute Mania

From "Mind and its Disorders," by W. H. B. Stoddart, who first recognized excessive movements of the large joints to be a symptom of mania. By permission of Messrs H. K. Lewis and Co., Ltd.

Typically the patient in the manic phase is excited, full of self-confidence and self-importance, busying himself with endless affairs, each of which he drops unfinished to press on to the next. In this ceaseless press of activity he manifests an exalted mood, grandiose ideas, and violent pugnacity in the face of interference.

Some delusions may occur with such emotional states—*e.g.*, the patient may believe that he is a great public speaker or a general leading his armies on to victory. In the course of a few days, months, or years he may appear a very different person—depressed, gloomy, docile, and torturing himself with reproaches for imaginary or greatly exaggerated sins. Such a rhythm, but of a less emphatic kind, has been discovered running through the life of many men of genius, accounting for their periods of fruitfulness and creative decline. In the life of Goethe such a manic-depressive rhythm, with a seven-year period, has been detected.[1]

McDougall has put forward an interesting theory of this cyclic or manic-depressive madness. It is due, he maintains, to a disturbance of the normal balance and interplay of the instincts of self-assertion and self-submission in the controlling sentiment of self-regard. The behaviour of the manic phase is that of the self-assertive instinct unchecked by any submissive tendencies, while the opposite holds in the depressive phase. The normal man maintains a sober, self-critical relation to his fellows because a constant interaction and even conflict of these two instincts is going on, according to the stimulus of circumstances. This conflict may waste much energy, just as the continual braking and



MANIACAL HANDSHAKE

Note the hand held high and the grandiose sweep of the arm. This characteristic symptom was first noted by Dr W. H. B. Stoddart, who contrasted with it the lifeless handshake of the melancholiac, having a wrist movement only.

From "Mind and its Disorders," by W. H. B. Stoddart. By permission of Messrs H. K. Lewis and Co., Ltd.

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[1] See Kretschmer's *The Psychology of Men of Genius*.

acceleration of a car in traffic wastes energy, but it is a necessary procedure if we are to avoid collisions with our fellows and a false idea of our position in life. The manic-depressive has avoided this conflict by repressing all humiliating ideas on one occasion and all self-satisfying ideas on another. Apart from this explanation the periodicity remains a riddle, although physical factors are suspected, for we all know how good physical conditions favour self-assertion, while exhaustion and illness favour submissiveness.

In this survey of the principal forms of acute abnormality one last, bizarre phenomenon calls for attention. We have observed several times the operation of repression, resulting in the splitting off of ideas from consciousness. What would happen if this repulsion and cleavage took place not between a main stream and a small rejected part of consciousness, but between two approximately equal streams? The whole personality would be split into two equally powerful and influential, but mutually incompatible, systems of ideas and habits. This theoretical possibility becomes realized in the condition known as 'dual personality,' where each system alternately and for an indefinite period takes charge of the organism, to the complete exclusion of the other. Naturally such a solution to conflict is relatively rare—owing to the unusual disposition of psychological forces necessary to bring it about—and considerable interest is always aroused by authentic cases.

Stevenson's *Dr Jekyll and Mr Hyde*, although a fairly truthful picture of such a character, is scarcely as strange as many recorded cases. Morton Prince in one instance discovered a girl with three or four distinct personalities. While talking to the one temporarily in the ascendant he was able to communicate by writing with another personality. Since this mind was of the same calibre as the dominant personality it could not properly be called 'the unconscious,' and Morton Prince accordingly speaks of "the co-conscious" mind. Usually each personality has access only to its own memories, so that the individual, on appearing in a new personality, has no knowledge of what has transpired during the mandate of the other personality.

A close study of the onset of such a case (as in the following dual personality observed by Morton Prince, Cory, and McDougall) shows us how such changes are related to the less devastating variations of personality which most of us experience.

"Maria" first showed clear signs of functional trouble after an emotional shock occasioned by the tragic death of her father when she was about twenty years of age.

> Many things occurred during the years that followed that now clearly show that a well-organized subconscious complex was formed and that at times it exerted a dominating influence. . . . [She became] subject to moods of extreme vanity, and occasional bits of conduct which were to her, at the time, inexplicable, such as, without intention, getting out of bed and going through weird dances.
>
> In her twenty-sixth year the complex, which seems to have been incubating during the preceding years, first manifested itself more completely by producing an automatic song, an incident which startled and puzzled Maria. Shortly after this incident the complex appeared as a full-blown secondary personality in full possession of the organism; and, from this time on for some years, two personalities, called A and B, alternately controlled the organism. A seemed to differ but little from the normal personality. B claimed to be a reincarnation of a Spanish gipsy girl who had led a romantic life as a singer and dancer; and she lived up to this *rôle*, even speaking and writing at times an imperfect form of the

Spanish language, and always speaking English with a foreign accent.[1]

Duality of personality is at first sight a startling and incomprehensible thing, but McDougall has shown that an intelligible explanation is possible by means of the same principles and mechanisms as have been so helpful in other fields. He relates alternation of personalities to manic-depressive disorders, where we have an alternation of moods. The former, like the latter, is due to a looseness of structure of the self-regarding sentiment. Certain powerful instincts are being prevented from playing any part in this ego sentiment. They coalesce into an independent syndicate, which, dissociated from the original ego consciousness, is powerful enough to have a life of its own—to form, in fact, a secondary personality. That this is the true explanation is witnessed by the fact that the two personalities are always widely at variance in their emotional make-up. One or more instincts are practically absent from one personality and strongly present in the other, just as, in the moods of the manic-depressive insanity, the self-assertive instinct runs wild in one phase and the self-submissive in the other. Thus, in the case of a girl studied by Prince, the main personality was very prim and proper, steady and subdued. Neither sex nor self-assertion played any part in it. But two such powerful instincts are not jointly to be repressed without coalescing into a formidable opposition. They reappeared in the form of a secondary personality, the personality of a daring, impudent, irrepressible, and sexually precocious girl, whose behaviour astonished and shocked the original governing personality. The separation of memories as in two watertight compartments is not the cause of dual personality: it is a sequel to the separation of the instinctive emotional life into two streams. For frequently this separation of memories has only developed to a slight extent, or has developed only in a one-sided way. A may have access to the knowledge of B, without B's having access to the memories of personality A.

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[1] McDougall informs us that she had lived as a young girl in a convent school where there were Spanish pupils, so that her unconscious mind had the necessary equipment for this part.

Perfectly developed dual personalities are, fortunately, rare; otherwise our social life might become very complicated, legal measures would have to be modified, and family life would be a little uncertain. Probably most recorded instances of 'possession by devils' and speaking with a 'gift of tongues' are cases where a secondary personality has developed. Certainly a considerable number of spiritualist media have personalities of this kind, possessing desires and memories genuinely unknown to the original personality in its normal state of consciousness.

Since none of us has a perfectly integrated self-regarding sentiment, every one can claim some degree of dual personality. On some days, perhaps, one is a more dominant character, wrapt up in business affairs, steady, ambitious, having ready access to all memories connected with this mood. A change of environment, perhaps to a holiday world, brings stimulations which call forth a personality of which one has been long unaware. The sexual and gregarious impulses, for example, may come to the fore. The memories, the habits of thought, the very character and personality, associated with the workaday world fade out. A vaguely defined secondary personality has appeared. How much more truthful it would be if the business-man, instead of telephoning his wife that he would be detained at the office, pleaded that it would be pointless for him to return home, as he had been unexpectedly overtaken by a secondary personality!

Our rapid glance over the chief varieties of mental abnormality must inevitably leave some sense of perplexity. Here and there a brilliant mind among the handful of psychologists working on these problems has noted some resemblance, perceived some mechanism, established some statistical law. And we see the beginnings of explanation and of control. We see principles which link up abnormalities with normalities, producing at once an illumination of both. But the world of the insane is a dark and a tragic one, in which the advance of science is all too slow.

CHAPTER XI

ORDER IN DIVERSITY: PSYCHOLOGICAL TYPES

Of all the diversions available to the amateur psychologist few are so entertaining as that of sitting in a *café* or tavern to study psychological types.

A crowd of human beings appears at first sight to present as bewildering—if not as beautiful—an array of forms as may be found in the flowers of the field. The botanist simplifies his world by introducing classification, and the psychologist, whether amateur or professional, must do the same, since the happiness of each one of us depends, at some time or other, on making rapid judgments of character.

Consequently we are not surprised to discover that every generation, from ancient times to the present day, has had its fashionable system of classification.

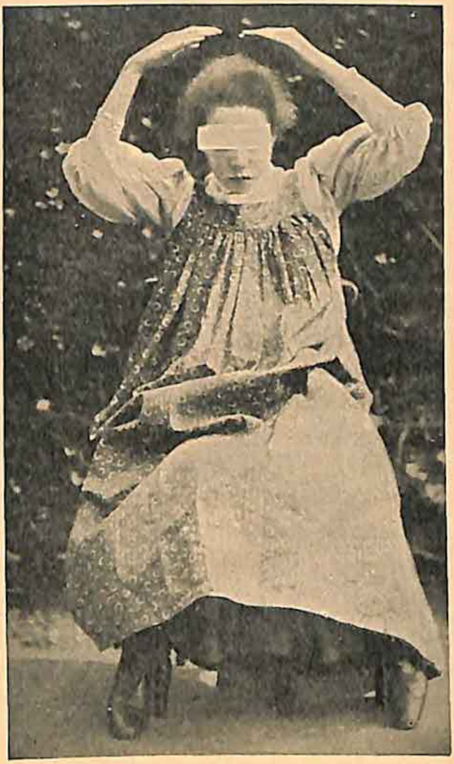
Hippocrates, the Greek physician, made a good start, with the theory that there were essentially four types of temperament, each having its peculiar mental and physical characteristics. Each type was produced by the predominance of one of the four principal body fluids—or 'humours.' Aristotle and others refined the theory. According to this classical theory, people with an excess of black bile, given out by the liver or spleen, were likely to be slow in thought, pessimistic, and melancholy. In appearance they were thin, angular, and dark-complexioned (from excess of black bile in the body). Those with an excess of yellow bile, or choler, which was an acrid and pungent fluid secreted somewhere near the spleen or gall-bladder, were hot-tempered, strong, and violent—*i.e.*, of choleric temperament.

When a person made a lot of blood, relative to the other fluids, he developed a sanguine temperament—*i.e.*, was cheerful, active, and optimistic. From this plethora of blood he was physically fresh and ruddy in complexion, full-bodied, and fair. The fourth vital bodily secretion the Greeks conceived to be phlegm. People with an excess of phlegm had cold extremities, were slow, lethargic, and, in fact, 'phlegmatic.' Indeed, our four terms 'melancholic,' 'choleric,' 'sanguine,' and 'phlegmatic' are derived from the ancient names of these four fluids. All intermediate temperaments could be derived from these four types by admixture.

Unfortunately, modern physiology smiles at this simple account of the body fluids, while psychology has other ideas about temperament.

The first sound step towards understanding human temperaments was made through studying the exaggerated types seen among insane and neurotic people. Fifty years ago the medical men in charge of the insane felt the same bewilderment as the reader must have felt in surveying the array of abnormalities considered in the last chapter. A German psychologist, however, noting resemblances among these principal varieties of disorder, and observing how, under the same kind of stress, some temperaments invariably suffered one kind of breakdown and others another, came forward with the suggestion that there were broadly two types of nervous structure, each liable to a certain type of insanity. On the one side he placed mania, melancholia, and kindred disorders in which, even with profound upset of the emotions, the personality still acts as a whole and the person still has some understanding of his condition. On the other hand he placed dementia præcox and systematized delusions, conditions in which the patient becomes shut-in, inaccessible to reason, and, as it were, dismembered in his emotional life. The former were called the 'cycloid' types ('cyclic' insanity being characterized by a cycle of phases) and the latter 'schizoid'[1] types (meaning 'split up,' because their emotional life seems artificially split up and disintegrated).

Shortly after this the Swiss psychologist Jung, of whom we have already spoken in connexion with psychoanalysis, observed peculiar differences among the neurotics who attended his clinic, and divided his patients, accordingly, into two types—'extraverts' and 'introverts.'



A Dementia Præcox Patient

Dementia præcox is a disorder of the schizophrenic type, in which the normal emotional life and responsiveness seem to have disappeared completely. The patient's limbs are held in any position in which they happen to be placed, as in the above photo.

From "Mind and its Disorders," by W. H. B. Stoddart. By permission of Messrs H. K. Lewis and Co., Ltd.

The introvert is shy, sensitive, rather unsociable, thoughtful, and deliberate. He hides his emotions, and carries on beneath a non-committal outward mien an intense inner life. The extravert has the opposite traits, is fond of society, easy and natural in company, and is even fond of being in the limelight. He is less thoughtful and more emotional and impulsive. He is fond of art, theatricals, and sport, while the introvert turns more naturally to philosophy, science, and relatively remote, inaccessible subjects.

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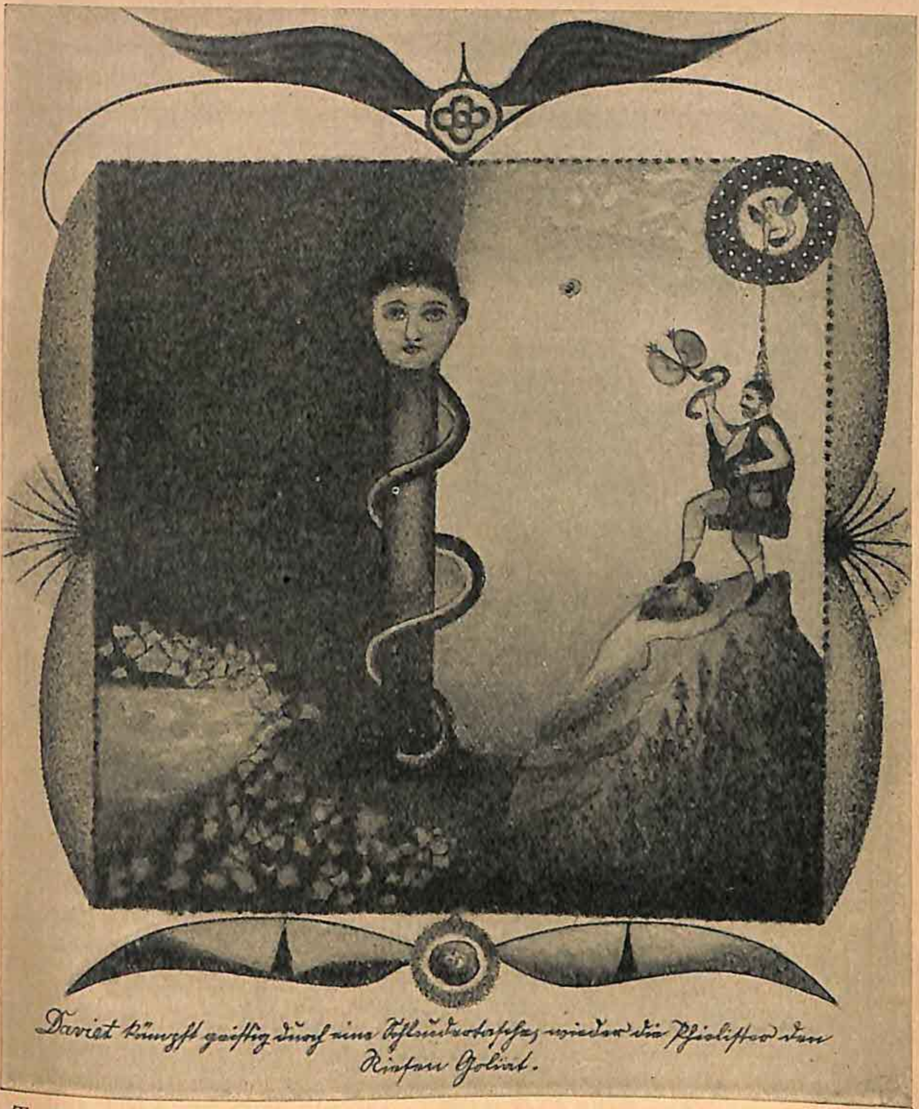
[1] Pronounced 'skitzoyd.'

Now the introvert, if he suffers nervous breakdown, is particularly liable to neurasthenia, or, with more profound disorder, to the schizoid type of mental disease. On the other hand, the neurotic troubles of the extravert are of the hysterical kind, with physical symptoms and a relatively happy consciousness.

Even in their crimes and vices the two types remain fundamentally different, the extravert being given to impulsive crimes of violence and bodily injury, the introvert to fraud and long-planned deceit. Suicide is far more frequent among introverts, as also is divorce, for although extraverts may more readily quarrel, they are also quicker to come together again.

Finally, there is a good deal of evidence that introverts are more given to drinking for the sake of drunkenness. The introvert Chinese expresses well that particular outlook when he explains, "Me no drinkee for drinkee; me drinkee for drunkee." We can see the reason for this when we reflect that the consciousness of the extravert swings easily and naturally from one emotion to another, but the consciousness of the introvert carries reverberations of all the jarring incidents and conflicting ideas which he has encountered during the day. Alcohol bears attraction for him because it shuts off this fringe of disquieting memories: it makes him temporarily extravert. The drunken man is the picture of a typical extreme extravert.

Jung's distinction of introvert-extravert has been developed by McDougall, and brought into line with the


David kämpft geistig durch eine Schleudertasche wieder die Philister den
Riesen Goliat.

TEMPERAMENT AND THE GENERAL TYPE OF INSANITY FROM WHICH A PATIENT SUFFERS ARE USUALLY DETECTABLE IN HIS DRAWINGS

Observe the exaggerated symbolism, the irrelevant detail meticulously carried out, and the general incongruity in this picture, drawn by a schizophrenic and expressing his delusions. Certain alienists claim to observe resemblances between insane products and some products of modern art!

From "Handbuch der Geisteskrankheiten." By permission of Verlagsbuchhandlung Julius Springer.

old classical notion that temperament differences depend upon bodily, physiological 'humours.' McDougall thinks there is good reason to believe that the conduction of nervous currents from nerve cell to nerve cell takes place more rapidly and easily in the introvert. Owing perhaps to the chemical condition of the blood, the resistance at the synapses—the junctions between nerve cells—is higher in the extravert, and permits nerve impulses to pass less readily. This would explain the relative 'sensitiveness' of the introvert, and the fact that he is relatively unable to keep his ideas happily in watertight compartments. Moreover, alcohol, we know, increases the resistance at synapses. Thus we have explained physiologically why alcohol converts the dour introvert into the happy-go-lucky extravert.

Recent research has shown that this introvert-extravert distinction is only a rough approximation to the truth. There are really two kinds of distinction involved.

The discovery came about in this way. Psychologists had long known that mental effects tend to persist much more in some people than in others. Every one has experienced the insistent recurrence of a tune; or the rhythm of the engine wheels persisting in consciousness long after the train journey is over; or the way in which a game of ping-pong following closely on a game of tennis is upset by the persistence of tennis strokes. This 'perseveration' effect, as it is called, is much more marked in some people than in others, and a striking feature of some insanities, particularly melancholia and dementia præcox. The insane person monotonously repeats the same remark or makes the same movement, being unable to turn to anything else. From such observations it seemed likely that the two extreme types of abnormal mind, which had given the first clue to the introvert-extravert division of normal people, would prove to be respectively high and low perseverators. Dementia præcox seemed the extreme of high perseveration, while mania, with its inconsequent flight of ideas, would be the extreme of low perseveration, or non-perseveration. Similarly, introverts promised to be high perseverators and extraverts low perseverators. If good tests of perseveration could be found this theory might be tried out, and perhaps a means would be found of diagnosing a person's temperament by a short laboratory test.

From little items of behaviour it is frequently possible to infer whether a person is a high or a low perseverator. Gladstone had a theory that after any violent shock one should remain perfectly still for ten minutes. On one occasion he slipped heavily on the pavement while out walking, and embarrassed his friends considerably by insisting upon remaining where he sat until ten minutes had slowly passed. From the necessity he felt for this unusual procedure one may fairly suppose that his nervous system was of the perseverative type.

Many tests were made by two Dutch scientists who had first realized the importance of this line of inquiry. One successful test consisted of a disk with black and white radial lines. When the disk is rotated a flicker of black and white is first seen, but as the speed of rotation increases the lines appear to fuse to a uniform grey. The speed at which this happens is different for different observers. High perseverators enjoy a long time lag in their visual sensations. The last sensation has not died down before the next appears. This inertia enables the black to fuse with white even at low rates of rotation. Low perseverators, on the other hand, 'get the colour out of their eyes' very quickly, so that the disk has to rotate very rapidly indeed before the black and white sensations become fused.

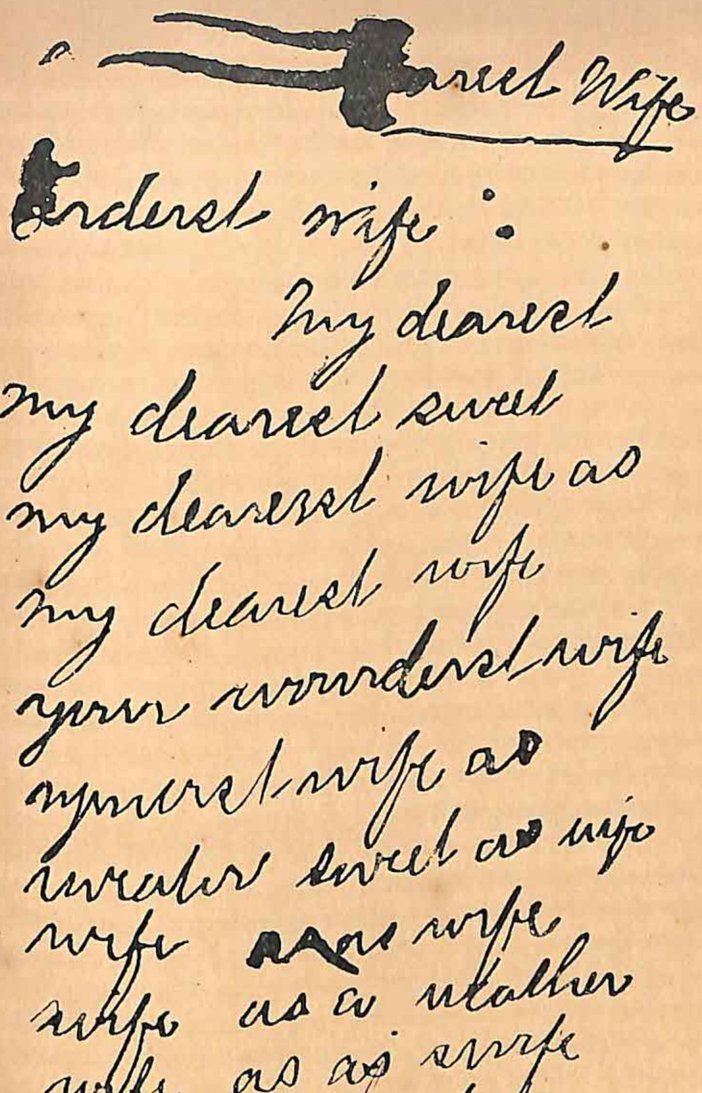
But a true understanding of the importance of perseveration was first attained by an Englishman of the name of Lankes. Unfortunately, although he opened up immense possibilities for psychology, he was shortly compelled, like many another worker in that science, to look for some means of support. Just as the fruits of his work became evident he had to drop his research and take up a post in India. Here, shortly afterwards, he died, and a rare, imaginative, and brilliant scientist was lost to a science which can ill afford neglect.

THE BOY IS WATCHING AN ILLUMINATED DISK INSIDE THE BOX SIMILAR TO THE ONE SHOWN ON THE OUTSIDE

When flicker ceases he depresses the electric key which records the speed.

By permission of Dr Elrington, Besford Court, Worcester

Another test, this time used by two London investigators, Pinard and Stephenson, who carried on Lankes's work where it had been abandoned, was extremely simple in conception. The subject was asked to write W's in a row very rapidly. After he had been doing this for some time he was suddenly asked to write them backward,



[illegible]arest Wife

[illegible]rdearst wife :

My dearest

my dearest sweet

my dearest wife as

my dearest wife

your wonderst wife

ymerst wife as

iwrater sweet as wifo

wife [illegible] wife

wife as a ulather

wife as as wife

as dea[illegible]s' [illegible]

cris sweet dearest

Letter by a Man suffering from a Form of Insanity in which Exaggerated Perseveration is found (Dr Stoddart's Case)

From "Mind and its Disorders," by W. H. B. Stoddart. By permission of Messrs H. K. Lewis and Co., Ltd.

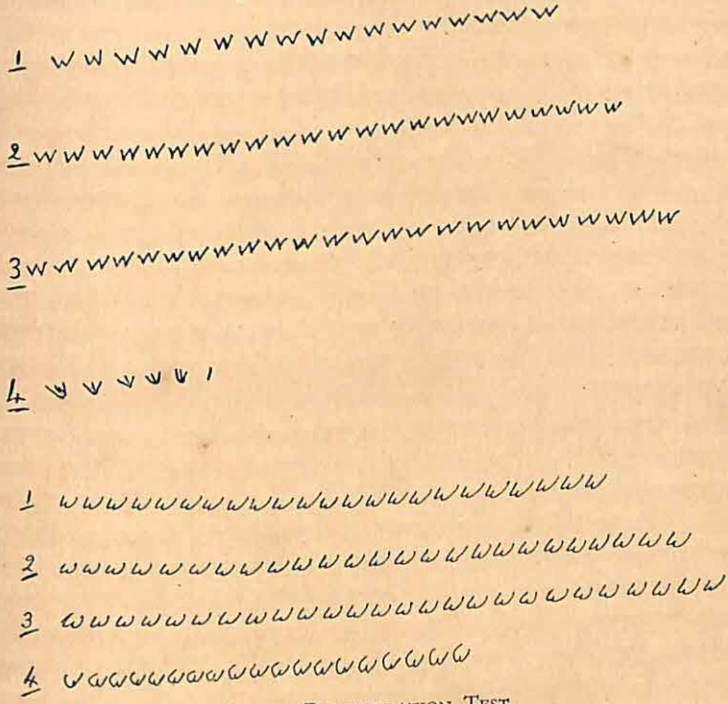
making each letter from right to left instead of from left to right. High perseverators would make a very poor score in this second phase, because the tendency to go on in the usual way persists so strongly that it interferes with the new tendency to reverse the writing. From a comparison of the number of letters made in each phase an exact measure of the person's perseverative tendency can be gained.

Stephenson, convinced of the necessity of studying extreme types, visited many asylums and measured the perseveration of nervous disorders. His results agreed well with expectation: manics and hysterics were non-perseverators; dementia præcox cases were very high perseverators. A new diagnostic tool was placed in the hand of the psychologist. He was able to predict the type of mental disorder to which any mildly abnormal person would be liable, and to take preventive measures.

Where medical men had been content to wait and observe the patient for months while the disease developed before being able to diagnose it, Stephenson, by his ingenious experiments, carried out under many difficulties, showed the way to rapid classification. He was even able to show that the beginning of recovery is heralded by a change in the perseveration index.

When these tests were tried on introverts and extraverts, however, the results were found to have practically no relation to the types. An analysis of the character qualities alleged to belong to the introvert and extravert soon showed that not all the traits really go together. A new temperament type emerged, the 'surgent' temperament, with its opposite, the 'desurgent.' The surgent type is the true core of the loosely defined extravert type. A typical surgent temperament is cheerful, sociable, humorous, tactful, fertile in imagination, and rather 'forward' in social life. The desurgent type is unsociable, reserved, slow in thought, tactless, and shy.

It was next found that this difference in behaviour arose from a fundamental difference in speed of nervous reaction. The surgent types are quicker in writing, reading, in recalling ideas, and in their bodily movements, although they are, on an average, only of the same intelligence.



A Simple Perseveration Test

In this test the subject first writes W's in the normal way, as rapidly as possible, for three half-minute periods (1, 2, 3), and then writes W's 'backward,' beginning at the right-hand end of each letter, also for half a minute (4). The perseveration score is obtained by dividing the average of the first three lines (number of W's) by the last. The lower example is done by a moderately low perseverator, the upper example by a youth suspected to be a case of dementia præcox (high perseveration).

After giving a number of specially devised speed tests to a group of students the writer picked out for interview the two men who had proved respectively to be the quickest and the slowest in nervous reaction in the whole group. G, the quickest on the list, proved to be a budding teacher, more at home in the classroom than with his academic studies. He had a cheerful presence, a charming, witty, and tactful remark for every occasion, and he showed every desire to hold his interviewer in conversation as long as possible. He was immaculately, if a trifle flashily, dressed. The writer was told by the staff that G was highly popular with all the other students, but that he had recently failed in his final examination because he gave so little time to work. His spare time went to bridge and dance parties which he himself organized. On all festive occasions he specialized in shaking rare cocktails and in strumming on a ukelele, blissfully accompanying his own very mediocre voice.

B, who had the lowest speed in these laboratory tests, proved to be a highly capable student doing valuable research-work in biology. Hiding as best he could the baggy knees of his trousers, he sat down diffidently and uncomfortably to face a conversation with his interviewer. His face lacked animation, and the desultory conversation had constantly to be revived by the interviewer. On a second and third interview, however, better progress was made, and B displayed an astonishingly wide and catholic acquaintance with the writings of modern novelists, poets, and scientists. The writer gathered from others that B was regarded as a recluse by most of the students and was little known, but that he had two bosom friends, C and R, capable students like himself, who greatly appreciated his company. He manifested soon an invincible but rather gloomy contempt for the shallowness of popular ideas and the hollowness of popular amusements. Later the writer found that B was a very skilled musician and a collector of good etchings.

This striking and important surgent-desurgent temperament difference has been shown to have no relation to 'perseveration,' but to be closely connected, as already indicated, with a general speed factor known as 'fluency of association,' which is manifested in a great variety of experimental situations. So much for the neat generalizations of the theorists about introversion and perseveration! Yet perseveration *has* been shown to determine temperament differences, although of a more subtle kind. High perseverators, whether surgent or desurgent, are sensitive, absent-minded, quietly detached, coldly critical, and chronically dissembling.

INK BLOT USED IN A 'FLUENCY OF ASSOCIATION' TEST

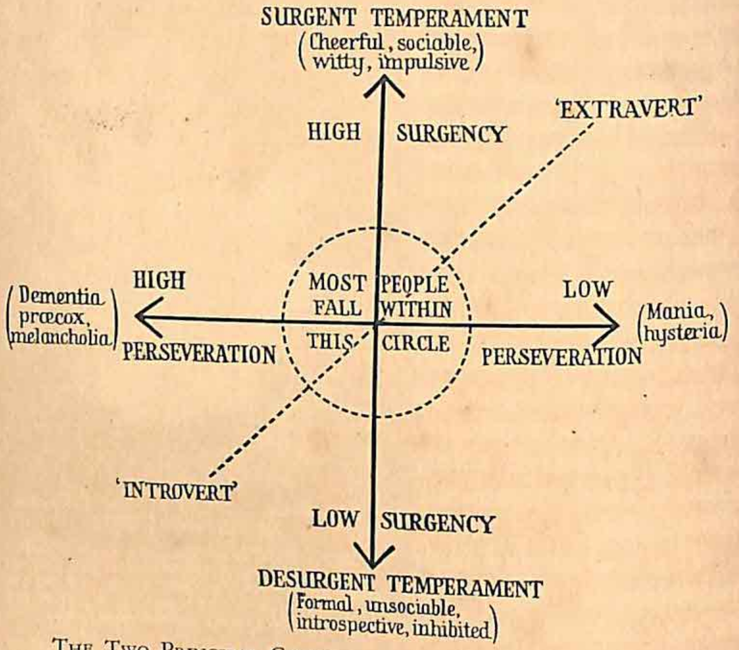
One is asked to see different things in it, just as one does in clouds or the embers of a fire. In one minute a very surgent person will see ten to fifteen objects, and a desurgent person one or two. The average score is about six.

That was surely a high perseverator who, on being offered half a crown, borrowed from him a year earlier, replied, "No, thanks; you keep it. After all this time I couldn't change my opinion of you just for half a crown." Conservatism of thought and feeling is one of the first consequences of high perseveration. High perseverators also seem particularly liable to nervous breakdown and neurotic disorders of a neurasthenic kind.

The low perseverator is more tough and energetic, lacking in respect for fine points, talkative, and given to nagging.

It is easy to see that the introvert type, which Jung thought he had isolated by his clinical work, is really a mixture of a highly perseverative with a desurgent type.

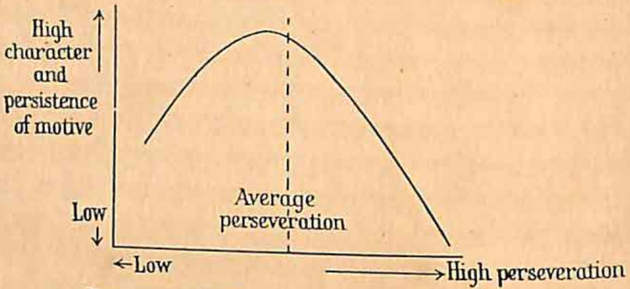
The differences between surgent and desurgent types are more obvious in social life than the differences between high and low perseverators. But the latter differences, although more subtle, may have very important consequences in conduct. This fact emerged in a remarkable way during the researches of Pinard. He was carrying out his testing experiments with boys and girls in a large children's home. Wishing to know all his subjects intimately, and perhaps desiring to do a good turn to the staff, who had voluntarily helped him so well in his detailed and laborious experiment, he would take out parties of


SURGENT TEMPERAMENT
(Cheerful, sociable, witty, impulsive)
HIGH SURGENCY
'EXTRAVERT'
HIGH PERSEVERATION
(Dementia præcox, melancholia)
MOST PEOPLE FALL WITHIN THIS CIRCLE
LOW PERSEVERATION
(Mania, hysteria)
'INTROVERT'
LOW SURGENCY
DESURGENT TEMPERAMENT
(Formal, unsociable, introspective, inhibited)

The Two Principal Co-ordinates for fixing Temperament children for games and for picnics. He had frequently thought that these children were more troublesome, more mischievous and quarrelsome, and more steeped in natural wickedness than the normal child, but he had had little experience of children in a group, and so wisely held his peace. Upon looking up the perseveration records of these children whom he was constantly invited to take out, he was astonished to find that they were, every one, either high or low perseverators; there were no middle types. How had this selection come about? The answer was a very simple and human one. Each house matron had given him her most troublesome children to take away. His suspicions that the children were unusually troublesome were not ill-founded after all. He thus accidentally made the discovery that both very high and very low perseverators were bad or poor characters.

This valuable result was soon confirmed with adults. We have already seen, in a previous chapter, that a general factor of 'strength of character' (centring in 'persistence of motive') has been proved to exist. People who possess a good measure of this function are reliable, conscientious, and governed by principle. When the students of the surgent-temperament research just discussed were ranked by their fellows according to their amount of this character factor a relation was at once obvious with respect to the perseveration scores. The best characters were the middling and moderately low perseverators. The highest perseverators were languid and relatively spineless, but sympathetically considerate individuals, addicted to a constant dissatisfied changing from one interest to another. The lowest perseverators were almost equally unreliable, but in the sense of being selfish, tough, wayward, individualistic, narrow, and opinionated busybodies.

Why should such a strange relationship exist? That is a riddle as to the solution of which we can at present only speculate. Perseveration is almost certainly a physiological tendency deeply implanted in the chemistry of our nervous tissues. Temperament has, after all, a bodily basis. But is this greater or lesser tendency towards a lag of nervous processes to be regarded as an inborn, constitutional family tendency, or is it altered in each one of us by our experience, our food, our mode of life? Probably a disposition one way or the other is inherited, but there is clear evidence that the ups and downs of our life-history can affect it.



RELATION OF PERSEVERATION TO CHARACTER

'High perseveration' is obviously by no means the same as 'high perseverance.'

Earlier in the chapter we spoke of the flash of insight which enabled a German psychologist to divide the insanities into two great groups. The cyclic (manic-depressive) insanities are characterized by a rhythm of mania and depression, without impairment of intelligence; the schizoid insanities by a 'splitting of personality,' 'shut-in-ness,' and, generally, progressive deterioration of mental ability.

These, we have seen, probably correspond approximately to low and high perseverators respectively. Kretschmer, another German psychologist, observed that in general these types have each a distinct physique. Cycloids certainly are in a very high percentage of cases round, full-bodied men, with short limbs, thick necks, and square faces.

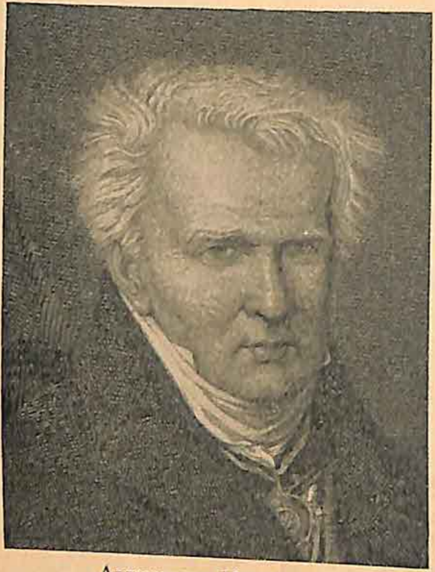
Schizoids, on the other hand, are more frequently than not of spindly build (whether tall or short)—lean, long-limbed, and small-waisted. Kretschmer has invented two terms —' schizothyme' and ' cyclothyme'—to describe ' normal' people who in temperament tend towards the abnormal (insane) schizoid and cycloid extremes. Recent research has shown that, even among schoolboys who have not yet attained adult proportions, the schizothymes are long-limbed, narrow-faced, and spindly-bodied, while the cyclothymes are fuller in build, shorter in the legs, and broader and rounder in the head. Thus, even from a casual glance, one may say with some degree of probability whether a person will be a cyclothyme—energetic, emotional, and a good mixer—or a schizothyme—sensitive, aloof, suspicious, idealistic. Kretschmer adds that the cyclothyme is a realist, a practical man, a good organizer, and a comfortable liver, while the schizothyme lives more in a world of ideas, puts great weight on principles, is more ambitious and less given to enjoying life by the way. Shakespeare had some intuition of this when he made Cæsar exclaim,

> Let me have men about me that are fat;
> Sleek-headed men and such as sleep o' nights:
> Yond Cassius has a lean and hungry look.

It is not for nothing, too, that artists usually represent saints, idealists, revolutionaries, and fanatics as of lean, long-limbed build, while men of affairs, comfortable, sociable types and organizers of big business, are represented by stocky, corpulent men.

Whole nations may be relatively schizothyme or cyclothyme in constitution. On the Continent the typical Englishman is represented as a lean, awkward-looking, lanky schizothyme, while the Central European—South German, French, or North Italian—is caricatured in English newspapers as a round, stocky cyclothyme. These popular caricatures express a real physical difference well substantiated by the anthropologist's statistics.

What is less often recognized is that the mental caricatures also express a real constitutional difference, and, moreover, correspond, as our theory would require, to the physical type. The cyclothyme Bavarian we regard as jovial, emotional, impulsive, and somewhat coarse. The Englishman is given the character, on the Continent, of being aloof, emotionally cold, languid, proud, and unduly fastidious in his tastes—*i.e.*, the character of the typical schizothyme. Dementia præcox, the extreme of schizoid development, is decidedly more frequent in England than on the Continent; while it is probable that mania and hysteria are more common upon the Continent.



ALEXANDER HUMBOLDT

Humboldt had the broad pyknic body build. His intellect found expression in science—an expression natural to the practical, realistic, good-humoured cyclothyme.

Our search for the true basis of human types has not been entirely barren, although, as usual, we find that nature is rather more complex than man's first speculations suppose. We have surgent and desurgent temperaments, distinguishable at once by their general behaviour and by the quickness of reaction revealed in experiments. Cutting across this we have high and low perseverators—schizothymes and cyclothymes—who pass in their extreme forms into two distinct fields of mental disorder.

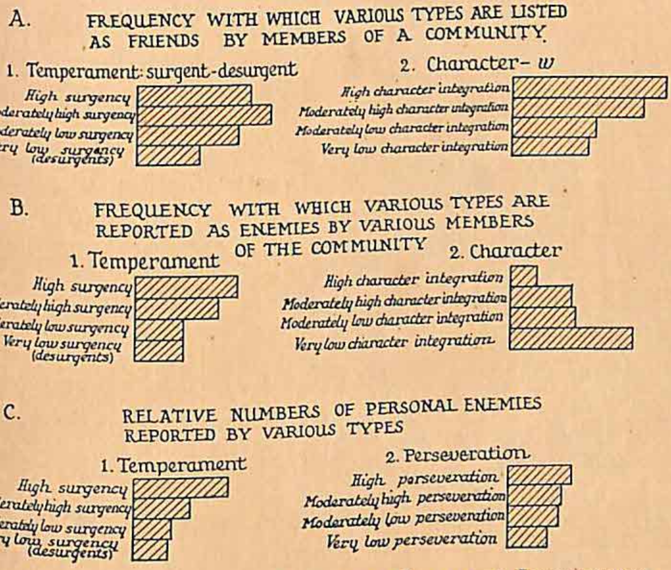
JOHN LOCKE

Locke had the typical lean, narrow build of the schizothyme. His intellect naturally turned to idealistic philosophical issues and the extraction of ultimate principles.

One last word of caution must be voiced in connexion with the notion of types. When we speak of two opposite human types it does not mean that all human beings are either of one type or the other. Human types are not as distinct as two makes of motor-car — they are just extreme poles of a line of transition, in which most people fall along the centre portion. For example, we could, if we liked, say that men are divided into a tall type and a short type, but this would not deny the fact that the majority are of average stature. We are distributed on a 'normal distribution curve' (see Chapter III) between two extreme possibilities. The pure surgent and the pure desurgent types rarely exist, but every man can be fitted into his exact niche somewhere on the line between the extreme surgent temperament and the extreme desurgent temperament.

A new and fascinating science is opened up when we study the reactions of various types one upon another. What is history; what are social customs, traditions, revolutions; what are the uprisings of leaders and movements, causes high perseverators to retreat still deeper within themselves—they react in a fashion contrary to that suggested—whereas other low perseverators become sympathetically restless and assertive.

All kinds of misunderstandings are bound to be prevalent



EFFECT OF HIGH AND LOW SURGENCY, CHARACTER INTEGRATION, AND PERSEVERATION ON THE NUMBER OF FRIENDS AND ENEMIES MADE

These results are from experiments in a large residential college. Surgent temperaments have both far more enemies and far more friends than desurgents. High perseverators are more critical and dislike more people than do low perseverators. Good character integration means more friends and fewer enemies—a good argument for character!

in a too mixed group. For example, the high perseverator finds the low perseverator coarse, naive, and insensitive, while his own kind are 'gentlemanly.' The low perseverator finds the high perseverator too suave, cowardly, and lacking in individuality. These findings are but the beginning of an immensely complex science which will be of the utmost importance to humanity.

but the story of the impact of different or similar temperaments according to certain psychological laws, more obscure and complex than those which control the evolution of the stars ?

By investigating a considerable number of stable friendships and violent animosities the present writer was able to show that definite relationships exist in the temperament types of the persons concerned. Like temperaments, on the whole, prefer each other, although in perseveration it seems that people must be either very alike or very different in order to find attraction in each other's company.[1]

High perseverators tend to have more enemies and fewer friends than have low perseverators. The cause of this is not yet clear. Possibly the neurotic tendencies, the extreme changeability, and the ' two-facedness '—the ' slimy quality,' as more than one observer has aptly expressed it—frequent among high perseverators, evoke distrust.

Natural leaders are almost invariably moderately low perseverators. Presumably this is a compromise between two tendencies—the ability to ' grip ' an audience, to convince and attract people, associated with the lowest perseveration index, and the ability to persist in a certain line of action (character), associated with medium perseveration. The moderately low perseverator sharing a good measure of both these qualities constitutes a born leader, providing he also possesses the requisite intelligence. People of high surgency are found to have many more friends—and also many more enemies—than desurgent types (see diagram at p. 239), for fairly obvious reasons.

Differing types affect each other's mental life in various ways. The rather noisy, tough, uninhibited child or adult, combining high surgency with low perseveration, generally

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[1] There are interesting racial differences in perseveration. Jews and South Europeans seem to be high perseverators. Scandinavians are low. When we recall that the low perseverators tend to be of the manic type we understand the ' Berserker rage ' of the Northmen.

In Germany the question has been taken up from the point of view of compatibility of married partners. The general conclusion, at least with regard to Kretschmer's types, is in accord with ours : that the most stable partnerships are between people of like temperament.

GOVT. TRAINING
HOOGHLY.
SCHOOL.

CHAPTER XII

WONDERS OF THE BODY-MIND RELATIONSHIP

EVERY man has had the experience of waking up some morning to the unpleasant surprise of finding life dull and distasteful, his clothes ill-fitting, his job uncongenial, and the political situation disgusting. A few hours later he suffers from the full-blown bilious attack of which his mental symptoms were the precursors.

Those fortunate people who appear to have no liver may yet have experienced the far-reaching mental effects of indigestion, influenza, or a mild fever. From such fleeting effects it is no great step to the relatively permanent changes of personality which accompany alterations in the blood chemistry in certain diseases. The invincible, light-hearted optimism of the consumptive, the petulance of the diabetic, and the changes of temperament which accompany blood-poisoning have long evoked medical notice and popular interest. Between mind and body there are subtle but powerful links which all the theories of medieval theology as to an immortal soul and a vile body cannot hide from us.

The Greeks, as we have seen, were very alive to these connexions, and derived from their observations the theory of four temperaments, each occasioned by the permanent predominance in a given person of one particular juice. Modern psychology finds no confirmation for these four simple types: indeed, the most striking temperament patterns are of quite a different nature—namely, surgent and desurgent and high and low perseverating. The physio-chemical bases of the latter as yet remain obscure.

But the establishment of the more emphatic temperament differences no more precludes the existence of further patterns than the discovery of near planets denies the possible existence of more remote ones. And by approaching the subject from the other side—from the study of blood chemistry—we are led to suppose that such subsidiary temperament types must actually exist. The story of these delvings in the region between body and mind is a fascinating one.

Anatomists of the last century were puzzled by a number of small blobs scattered throughout the body, to which they could assign no function. One of the first to be understood was in the pancreas. This organ apparently gave up to the blood passing through it a substance, insulin, the absence of which caused diabetes. By careful *post-mortem* examinations of people who had suffered from various obscure complaints the other 'functionless' organs were eventually proved to have definite purposes; for they were found to have changed in an unusual way in the bodies of these unfortunate people.

In 1855, long before insulin was discovered, a Doctor Addison had found a connexion between a certain fatal disease (now named after him) and tubercular deterioration of one of these small organs, now known as the adrenal gland. Eventually it was discovered that each was really a little gland, pouring its own special secretion into the blood. They became known as the 'ductless' or 'endocrine' glands, because it was found that they do not pour their secretion through a duct as, for example, the salivary glands do, but simply render up the secretion to the blood as it passes through them.

Defective working of one of these glands, the thyroid, situated on both sides of the windpipe, was found to be the cause of cretinism, a disease in which the person ceases to grow normally, remains stunted, develops spade-like hands and feet, coarse skin, and thin hair, and becomes mentally slow and stupid. From the fact that cretins occurred principally in districts of Switzerland, of Derbyshire, and around the Great Lakes of America, where there is a deficiency of iodine in the water, it was suspected that the secretion of this gland must contain iodine. This was confirmed, and some time ago a chemist, Harington, succeeded even in synthesizing thyroid extract in the laboratory. Years before this, however, miraculous cures had been effected by feeding patients with animal thyroid. The misshapen child began to grow again; the sub-thyroid adult, with his lethargy, low temperature, diminished sex drive, and falling hair, became once more vigorous.

Now a disease had been known, a variety of goitre, with precisely the opposite symptoms to those just described. The victim had a raised temperature, a rapid heart-beat, quick reactions, and tended to live in a state of feverish activity. A swelling of the thyroid gland accompanied this condition. Clearly these changes must be the outcome of too much thyroid juice in the blood-stream.

Between these two diseased extremes lie the majority of normal people, some being relatively sub-thyroid in type, others relatively hyper-thyroid—*i.e.*, having a greater saturation with thyroid secretion. These two types are distinguishable both by physical appearance and by temperament traits. The former are rather fat, comfortable in deportment, of dry skin, and, as we have seen, with a tendency to baldness. They are rather sluggish in thought and lacking in fineness of feeling. Joe, the fat boy of *The Pickwick Papers*, who went on errands fast asleep and snored while waiting at table, was a typical sub-thyroid personality, perhaps with an added defect of the pituitary gland.

The hyper-thyroid, fresh-complexioned, thin, and active, is quick in thought and highly-strung. He is inclined to restlessness and anxiety. Thyroid extract has been shown to act upon all bodily processes like the draught upon a fire, increasing the rate of combustion, mobilizing energy, increasing the speed of nervous conduction. Alarming changes of temperament have been witnessed as a result of disease of the thyroid; and beneficent changes, as from a slow, depressed consciousness to a normally quick and alive personality, have been produced by gland therapy.

Thyroid extract is the most powerful stimulant of bodily energy production known. It acts strongly in times of danger, of emotional and sexual excitement, and in various bodily and mental crises. But if the thyroid discharges too much all the time the individual is constantly too active and excitable, feels hot, perspires freely, has an 'irritable heart,' and complains of blushes and tremors.

We may summarize the gland types as follows:

1. The Thyroid Gland

Sub-thyroid Type	*Hyper-thyroid Type*
Tendency to fatness and coarseness of feature and to dry, insensitive skin and scantiness of hair. Dull, stable, comfortable, slow-witted, weak memory. Crude and clumsy in feeling and thought reactions. Continually sleepy and 'lazy.'	Lean, fresh-complexioned, finely formed bones and features. Active, restless, vivacious, excitable, and inclined to anxiety. Fine and sensitive in feeling. Rapid in thought and intuition.

Among the remaining glands both the physical and the mental make-up resulting from excess or deficiency are as yet imperfectly known, and the following summaries must be taken as partly speculative and liable to revision during the next few years.

2. The Adrenal Glands

These are two yellowish, conical organs, situated on top of the kidneys and secreting adrenalin. If adrenalin is fed to tadpoles they nearly all develop into males. There is considerable interaction of these glands with the sex glands.

Sub-adrenal Type	*Hyper-adrenal Type*
Opposite of hyper-adrenal.	Dark, thickset, muscular. Emotional, pugnacious. Capable of considerable exertion without fatigue. The typical he-man of the stage. Most rather masculine women are hyper-adrenal types.

3. The Sex Glands

In addition to having an external secretion for purposes of reproduction, the testes and ovaries have an internal secretion, which produces such 'secondary sex characteristics' as distribution of hair, muscularity, depth of voice, proportions of the figure. By transplanting these glands in animals males have been converted into females and females into males in bodily appearances and in behaviour. It follows that a more typically masculine or feminine character and a stronger amatory disposition are given to the mind by the adequate chemical action of these glands. Defective development of these glands probably accounts for such anomalies as strongly sadistic women and markedly masochistic men. There is considerable evidence that homosexual types are sub-sex gland types.

4. The Thymus Gland

This is in children a fairly large gland at the base of the neck below the breast-bone and above the heart. It acts as a brake upon the development of the sex glands, and practically disappears at puberty, when its vigil is over.

Sub-thymic Type	*Hyper-thymic Type*
Precocious and exaggerated sexual development.	Retention of childish bodily proportions and rounded childish features. The 'Mabel Lucy Attwell' picture type. Under-sexed and lacking in self-assertion. Sometimes lacking in moral feeling.

5. The Pituitary Gland

This is a small oval organ about half an inch across, lying at the base of the brain in the centre of the floor of the skull. It has two compartments, secreting two distinct hormones, each with its own peculiar action. The front half is concerned with bone growth. Excessive secretion produces giants and a bony, rugged facial appearance. The hinder half regulates the bodily consumption of sugar, the accumulation of fat, and the tone of visceral muscles.

Sub-pituitary Type	*Hyper-pre-pituitary Type*
Qualities opposite to those of the hyper-pre-pituitary type.	Ambitious. Masterful but self-controlled and 'mature.' Intellectual. Relatively unemotional.

The remaining endocrine glands, as the pineal and the pancreas, have less well-defined mental effects, but the parathyroids, situated in the thyroids, produce marked nervous effects when they are defective. The sub-parathyroid type is excitable and jumpy and, being prodigal of nervous energy, readily gets fatigued. Jaensch, in Germany, has shown that those with deficient calcium—a result of parathyroid defect—have very vivid visual images and are especially liable to hallucinatory experiences.

All the glands are mutually interacting, so that the complete account of gland types, when it is one day available, will be necessarily a very complicated story. Thus, as already mentioned, the thymus gland is antagonistic to the sex gland. The pituitary-gland hormone, on the other hand, can be shown to be essential to the vitality of the sex gland, for destruction of the pituitary leads to a diminution of size and function in testicle or ovary. When the sex glands are removed the pituitary increases in size, as if some antagonistic influence had been withdrawn. Thyroid and pituitary also flourish best in each other's absence.

Removal of the thyroid, on the other hand, checks the growth of the sex glands.

In addition to affecting each other directly they may also aid or neutralize each other's works and overlap in determining bodily and mental characteristics. Sex gland and pituitary oppose each other on the question of bone growth, the sex glands trying to call a halt to bone construction and the pituitary attempting to continue this process of lengthening the bones. Pituitary and adrenal glands help each other to mobilize sugar in the blood in times of stress. Thymus and pituitary aid each other in controlling general growth. Both thymus and parathyroid handle the lime chemistry of the body, with important effects on the excitability and fatigability of the nervous tissue. Adrenal and thyroid glands are frequently antagonistic in their effects, although favourable to each other's development. What a tangle of intrigue is spun in the blood of each one of us through the rivalries of these mysterious chemical potentates!

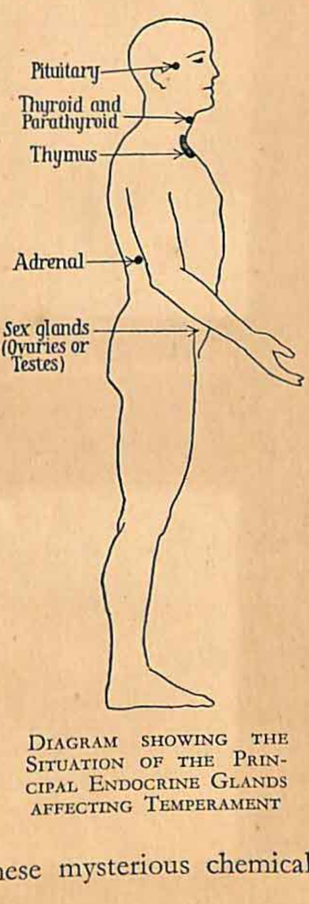
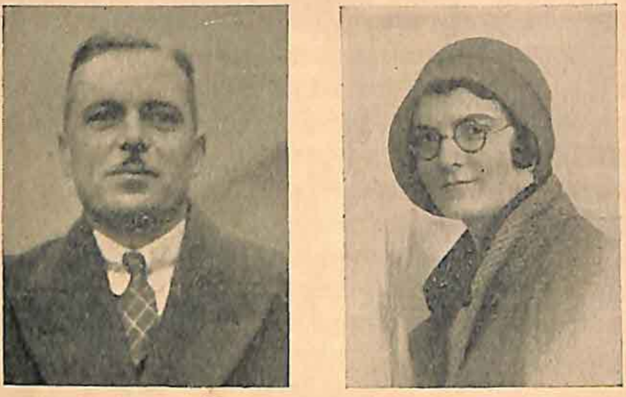


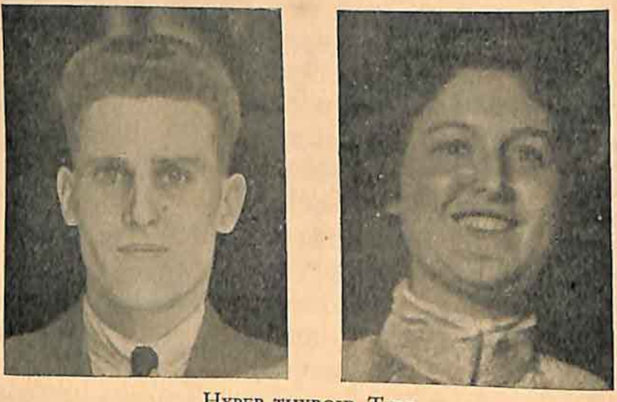
Diagram showing the Situation of the Principal Endocrine Glands affecting Temperament

In view of these complicated bodily politics the glands of internal secretion have been likened to an interlocking directorate in a large industry and to a polygon of forces acting upon a weight. Perhaps they can best be compared



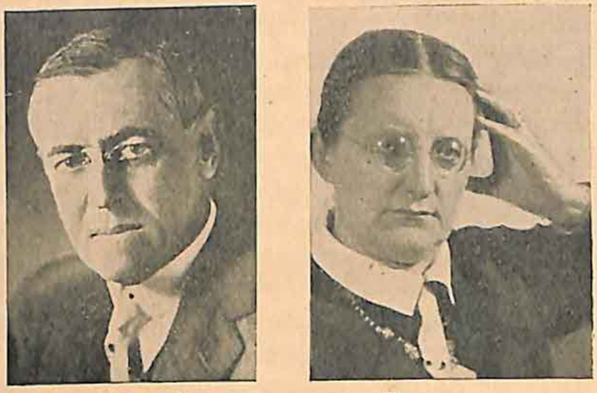
Hyper-adrenal Type

Dark, thickset; energetic, aggressive, irrepressible, capable in emergencies.



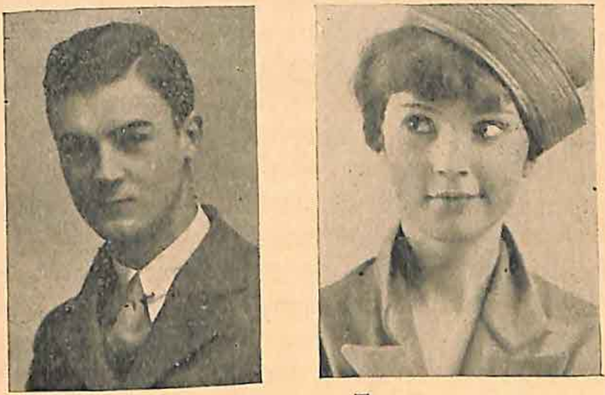
Hyper-thyroid Type

Fresh-complexioned, finely drawn physique; quick, sensitive, imaginatively emotional, excitable ,restless nervous activity.



Hyper-pre-pituitary Type

Large skeleton, prominent bony features; steady, thoughtful and intellectual, masterful, unswerving in purpose.



Hyper-thymic Type

Rounded features, relatively childlike physique; good-natured, suggestible, lacking strong feelings of sex or aggression, mercurial.

to a committee of management with various alliances and hostilities between members, which are still further confused by personal whims and prejudices. In the normal temperament these members are well matched, but now and again we find a committee dominated by one man. Then a well-defined thymic, or adrenal, or thyroid temperament results. So far the actual chemical structure of the hormones is little understood, although one (thyroxin), and possibly another (adrenalin), has been isolated in chemical purity.

One may approach still more closely to the problem of body-mind relationship by peering into the changes of bodily chemistry which take place during emotional states. Of all conscious experiences the emotions have, from remote ages, been considered to have the closest bodily connexions. "My heart leapt into my mouth." "I felt a horrible sinking feeling at the pit of my stomach." Can one imagine fear without these sensations? Or anger without distended veins, half-bared teeth, and a clenched fist? Or profound pity without a sensation of unshed tears?

Such considerations led the psychologist William James and the physiologist Lange to propound independently, a generation ago, a theory of the bodily origin of emotion, now known as the James-Lange theory. James maintained that the bodily changes precede the emotion, and that the feeling of the emotion is nothing more than the sensations coming up to the brain from the disturbed internal organs, the strained muscles, the hairs standing on end, etc. "We are happy because we laugh and sad because we cry," he said. He asked us to imagine an actor portraying some powerful emotion upon the stage. If it be anger, for example, he clenches his fists, puts on a fierce expression, stiffens the sinews, and employs the voice and gestures of an angry man. By so doing he inevitably experiences the emotion. James asserted the corollary "that if we would be possessed of certain emotions we should act as if we already possessed them; we should do kind acts and wear a benevolent aspect if we wish to be benevolent at heart."

Laughing Cavalier
Franz Hals

"We are happy because we laugh and sad because we cry." Who can imitate this expression without feeling something of the emotion depicted?

Photo Mansell

According to this cheerful doctrine, the hypocrite is already half reformed. And there is much in it. Ebenezer Scrooge set out to be known as benevolent and good, in spite of his hard and stingy nature. If Dickens's portrait is true to life he succeeded in changing that nature by doing the things that a different nature would have done.

Obviously, according to this theory, emotion is not, as it were, experienced in the brain. The brain is a receiver, which, perceiving a life-or-death situation, pulls the lever that sets the internal organs into a useful commotion. Emotion is the resonance, carried back to the brain, from all this busy-ness of the internal organs. Consequently, if the body could be detached from the brain or the bodily sensations completely cut off we should be unable to experience emotion. In Chapter I we have seen that surgical experiments and observations do not entirely bear this out. Dogs, cats, and human beings cut off almost entirely from their bodily sensations still experience some degree of emotion. Sherrington, for example, anæsthetized a dog, as far as all bodily sensation was concerned, and it still showed all the emotions of a normal dog. We have no proof, of course, that it felt them.

Nevertheless, the new work on the endocrine glands shows that there is a good deal in this old theory. Professor Cannon, by a number of ingenious and well-controlled experiments with cats and dogs under X-rays, has shown that in fear and anger a most complicated series of bodily changes occurs. The first nervous impulses from the brain, which has been the instrument for perceiving the dangerous situation, speed out to the heart, the lungs, and the adrenal gland, causing a rapid and more powerful heart-beat, quickening breathing, and causing a discharge of adrenalin.

So remarkable is this chemical that it produces in various parts of the body different changes all directed to the same end—increasing the strength and invulnerability of the animal. It rapidly splits up the animal starch in the liver, and puts at the disposal of the blood an immediate supply of sugar,[1] to be burned up in muscular exertions. It stops at once the churning movements of stomach and intestines, so that digestion ceases and the blood supply can be diverted to the big muscles required in fight or flight. It increases the coagulability of the blood, so that clots form readily over any wounds that may arise. It contracts the small capillaries of the skin, sending the blood inward, making the face pale, and producing a cold sweat. Finally, its chemical action is such that the power of the muscles and their resistance to fatigue are increased. The adrenal gland is, therefore, *par excellence*, the emergency gland, and has done much to aid the survival of man in a hostile environment.

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[1] This increase in blood sugar is at once revealed by a high sugar content of the urine, so that (except in diseased conditions) recent action of the adrenal gland can be inferred from the presence of sugar in the urine. The urine of spectators, after a football or boxing match, has been shown to have a marked rise in sugar content.

One might ask why, if adrenalin increases bodily power in this way, the body has not evolved a continuous, rich supply of adrenalin. The answer is clear: adrenalin acts upon the body like a mobilization order upon a nation on the brink of war. It stops all the constructive work of peace, the digestion of new material, and the building up of the body, and turns all nervous energy and supplies of blood to purposes of violent action and self-preservation. But it would be suicidal to keep up that state indefinitely. Some people, belonging to the hyper-adrenal type, do continuously keep up a more than average adrenal concentration. They are like nations that continuously maintain exaggerated armaments.

Intellectual and original minds which best serve the advance of civilization are not found among them, for the energy is in the wrong place. Animals fed with adrenal secretion make a poorer score than normal animals in learning to run mazes, but animals fed with pituitrin make a better score. This should be borne in mind in contrasting the hyper-pituitary and hyper-adrenal types. When we realize the part played by the adrenal gland in emotional conditions, moreover, we can readily see how most of the characteristics of the hyper-adrenal type are produced.

The thyroid gland also plays a part in the expression of fear. Many cases of swollen and over-stimulated thyroid gland, together with those staring, protruding eyes, which result from excess thyroid, were found among soldiers long subjected to terrifying situations and among the civil population after air-raids.

Naturally some one soon asked, " If the emotional tone is produced by the action of those hormones, can we not produce emotions artificially by injecting chemicals ? " A Spanish doctor first made the experiment on human beings, using quite large doses of adrenalin. His subjects complained of a " state of anxiety." They manifested tremors of the hands, flushing and paling of the face, unreasonable bursts of weeping, and dilated pupils. One of them described the vague state of emotional disorder by saying, " It seems as if I were afraid, but I am calm." Clearly the patients felt themselves lifted on a vague tide of fearful emotion, yet could not describe it as the normal fear or anger experience. Professor Cannon repeated the experiment on American student volunteers. They reported similar vague anxiety conditions. " I feel all worked up and on edge, as at the beginning of a race," said one.

Various attempts have been made to explain Freudian mechanisms in physiological terms—in terms, in fact, of the ductless glands. A Freudian speaks, for example, of a buried fear complex, emanating from the unconscious memory of some very fearful incident in childhood. The endocrine specialist would view this in a different light. He would say that all conscious memory for the event had gone, but that the shock was so severe as to cause a permanent over-function of the adrenal and thyroid glands, and a greater sensitivity of the nervous paths concerned, thereby making the person unduly fearful and nervous on all similar occasions. Such speculations on parallelism of mental and physical explanations may be premature, but they are almost certainly in the right direction.

So the riddle of the body-mind relationship is not to be so easily solved after all: the gland secretions alone are not sufficient to account for the richness of our emotional life.

One must not forget that the action of the glands is not the only bodily change during emotion. The glands work in domestic harmony with the changes produced by the vegetative nervous system. Our nervous system has two main parts: the brain and spinal cord, on the one hand, which have to do with rapid adjustments to the external world, with reasoning and movements of eyes, limbs, etc., and, on the other hand, an older, more scattered organization, which lies outside the spinal cord and comes together in a number of nerve bunches—*e.g.*, the solar plexus—situated among the internal organs. The task of the latter is to bring about the slow changes in digestion, excretion, breathing, circulation—the relatively 'vegetative' processes—necessary to bodily well-being. Occasionally, however, in response to emergency conditions in the external world, some of these internal adjustments have to be made pretty quickly, and then the vegetative system does some curious things. It may be likened to the engineer of a ship, who usually knows nothing of the problems faced and the quick decisions made by the captain on the bridge. He goes steadily about his job of keeping the engine in trim. But occasionally something drastic happens, and the peremptory order comes, he knows not why, to stoke his boilers to bursting-point, to shift his fuel, or to throw the engines violently into reverse.

In emergency conditions the vegetative (or 'autonomic,' as it is also called) system has likewise to drop its ordinary tasks and bring about violent changes in the energy-producing organs. Without further aid from the conscious mind it awakens its powerful servants, the endocrine glands, and with their chemical assistance stops digestion, speeds up the heart-beat, deepens the expansion of the lungs, voids urine, and produces changes in the viscera which we experience as a sinking at the pit of the stomach.

These changes are, of course, initiated and controlled in the first instance by the organ of consciousness, the central nervous system, and it is interesting to find that the part of the brain most directly concerned is the lower, older brain, which, as we have seen in Chapter I, is the part concerned with the experiencing of emotion.

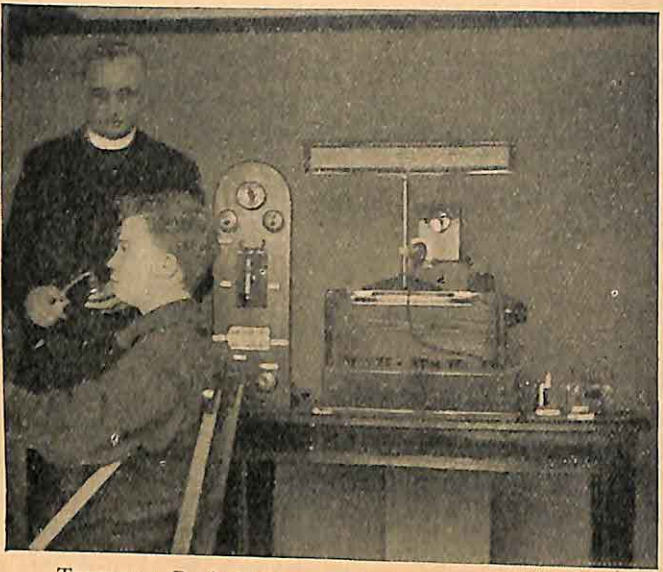
One gets the impression at a first glance into bodily emotional changes that the whole is a beautifully co-ordinated mechanism, designed to meet all kinds of emergency situations which the animal might encounter. Alas! even nature cannot design machinery to meet all needs, and, indeed, there are some very obsolete features about this ancient vegetative nervous system, the precursor of the central nervous system.

Dilation of the pupils, sweating, dripping saliva, colic, violent contractions of the heart and other muscles, are of doubtful value in primitive situations; while in civilized life they are a ridiculous handicap. Owing to the same mechanisms, we freeze stiff with fear in situations where action would sometimes be better. Of what use is it for a young tern to freeze so rigid that he can be pushed and rolled about like a stuffed creature by the hunter?

All of which brings us to examine sharply what we have been implying in regard to the purposiveness of emotion. Here we realize that the normal emotional accompaniment to instinctive action is by no means prominent if the instinct is unhindered. The man who can run freely is no longer conscious of intense fear, nor is a man free to pursue his inquiries consumed by increasing curiosity. But let some obstacle arise, and he experiences a frenzy of fear or an intolerable curiosity. The purpose of emotion is, therefore, primarily, bodily preparation, and, secondly, the increase of the desire and effort behind the instinct. If the emotional changes, when intensely stimulated, sometimes defeat their own purpose that does not mean that they are not well adapted under conditions of moderate stimulation. It is impossible for the electrician to construct a galvanometer which will be sensitive to the faintest currents and yet withstand violent discharges. Similarly, when, for security's sake, nature designs a nervous system acutely sensitive to the slightest provocation it is only to be expected that it will jam and allow energy to overflow into all sorts of superfluous excitement when the provocation is powerful.

One of the bodily changes produced by emotion—a change in the skin—has, for peculiar reasons, been an especial object of research. Yet more than a hundred scientists have returned baffled from their assaults upon the problem. Some fifty years ago an Austrian engineer, working with a delicate galvanometer, noticed deflections for which he could not account. To his astonishment, he observed that they corresponded to changes of feeling in himself. Every emotion that he experienced seemed transmitted by the wire which he held in his hand, causing the little needle to swing round as if a current of electricity had passed. Later research showed that a slight current is, indeed, produced by the body, but the greatest effect is due to a change in resistance of the skin during emotional excitement. Great hopes were entertained of measuring the strength of emotions objectively by this simple electrical device. But the fall in resistance is found not to correspond exactly to emotions. Its magnitude is most nearly proportional to the amount of striving, of effort, of impulse to act—in short, to all those experiences which the psychologist describes as 'conative.' Great deflections of the galvanometer needle follow experiences of pain, tension, shock, fear, excitement, or acts of will; small deflections follow pleasure, disappointment, dissatisfaction, or simple, effortless reasoning.

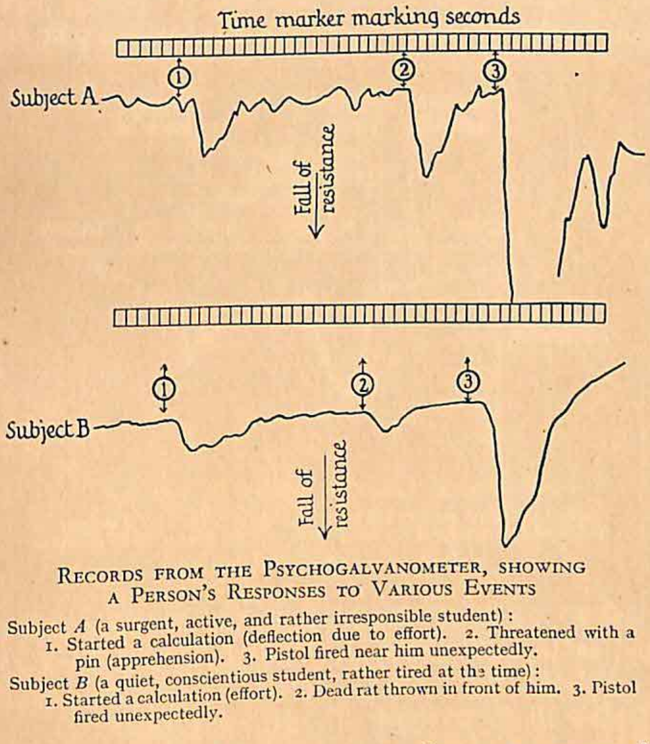
The 'psychogalvanometer,' as this apparatus is called, has been successfully employed for tracking down complexes. A series of records, each bearing a printed word, is exposed to the patient, and he is asked to respond with the very first word that enters his head. For example, one exposes 'dog,' and the patient replies 'cat'; one exposes 'blood,' and the patient replies 'bullet.' Under the old system one measured with a very accurate clock, reading to thousandths of a second, the time taken to reply. Words having no special significance for the patient were replied to in about half a second, but where a strong emotion or an unconscious



TESTING A BOY'S DEGREE OF IMPULSIVENESS BY MEANS OF THE PSYCHOGALVANOMETER

The magnitude of the deflections produced by various experiences can be seen from the movements of a spot of light on the scale shown in the centre of the picture.

By permission of Dr Elrington, Besford Court, Worcester complex was touched the reply was abnormally long in coming. There were many exceptions to this, and the method was always regarded as a rough and ready one. But if the person is connected to the psychogalvanometer, the words which stir strong conscious or unconscious impulses are at once picked out, and the analyst is able to get to the buried emotional root of the patient's neurosis.



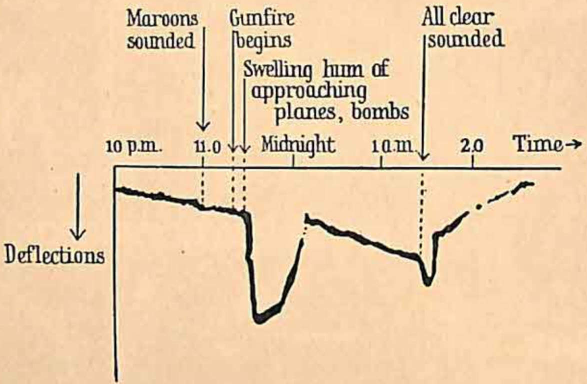
Records from the Psychogalvanometer, showing a Person's Responses to Various Events

Subject *A* (a surgent, active, and rather irresponsible student):
1. Started a calculation (deflection due to effort). 2. Threatened with a pin (apprehension). 3. Pistol fired near him unexpectedly.

Subject *B* (a quiet, conscientious student, rather tired at the time):
1. Started a calculation (effort). 2. Dead rat thrown in front of him. 3. Pistol fired unexpectedly.

It has been suggested by practical-minded people that this apparatus should be put into the hands of the police to aid in the detection of crime. A suspect could be presented with various objects, some of no significance, others connected with the crime (and known only to the real criminal). However successful he might be in withholding an outward sign of recognition or emotions, the psychogalvanometer would record his inward reactions.

The English legal system does not yet permit psychological methods; and, in any case, the psychologist might



Emotional Changes during an Air-raid

Psychogalvanic record, taken by Professor Waller, of a woman of stable temperament during the air-raid of Whit Sunday, May 19, 1918.

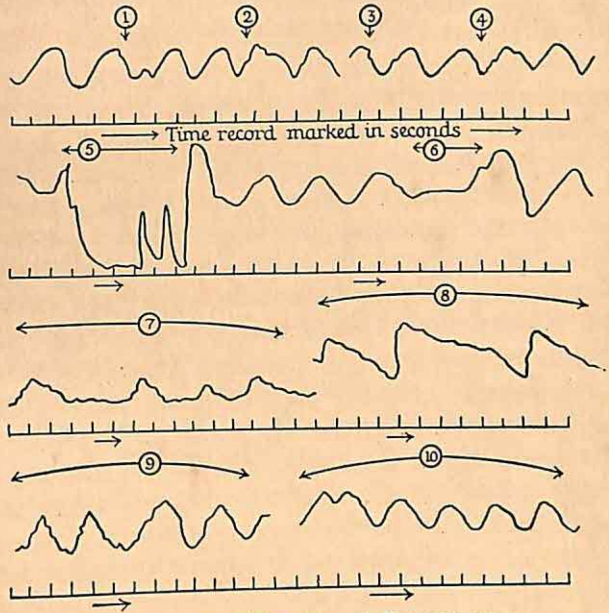
From "The Lancet," June 11, 1918

decline to assist in detection unless he were also consulted as to methods of preventing crime and reforming the criminal. But at least such methods would be infinitely preferable to the methods of the third degree.

Other subtle bodily changes have been explored, but with rather less success. A breathing record, taken from a pneumatic apparatus round the chest and printed, like a barometer record, on a moving drum, will show quite a lot of things.

Emotional conditions are shown by variations in the height and closeness of the curves (depth and speed of breathing), while any sudden change of attention, any momentary period of concentration, is revealed by a flat plateau followed by a deep trough (inspiration).

One Italian investigator worked out an elaborate method for determining whether a person is telling the truth or lying. Had it been possible to put a pocket apparatus on the market it would doubtless have had a great sale! The

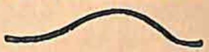
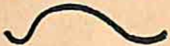


Pneumographic (Breathing) Record of a Male Student

Events: 1. He was asked, "Who took the photographs from the laboratory?" Reply: "I don't know." (Truth.) 2. He was asked, "Whom did you most enjoy dancing with last night?" Reply: "Miss ——." (Lie.) 3. He was asked, "Have you contributed to the —— fund?" Reply: "Yes." (Truth.) 4. He was asked, "Have you got any books out of the library?" Reply: "No." (Lie.)

Note after 2 and 4 the sharper trough and peak and the longer expiration. This is probably due to a sense of effort. (Compare 9.)

5. Hearty laughter on hearing a joke. 6. Arrest of attention on hearing a suspicious sound. 7. Prolonged concentration on difficult mental calculation. (Note shallow, irregular, infrequent breathing. Most of the smaller irregularities are records of heart-beats, which sometimes register on the pneumograph.) 8. Reading aloud. 9. A state of unpleasure (cold draught and evil smell). 10. A state of pleasure. (Note relatively rounded, even, shallow curves.)

essential feature of his technique depended on the fact that the breathing curve is normally of this form  but in conditions of effort or emotion it is of this form . Similar techniques have been worked out with the psychogalvanometer and the association time experiment, but in every case what is measured is not lying as such, but effort and emotion, and we all know that there may be effortless liars.

The philosopher has speculated entertainingly but fruitlessly for many centuries on the relation of mind and body, but now the scientist is revealing unexpected wonders in that relationship. Flesh is more spiritual and thought is more physical than we had supposed. The chemistry of the cell is at once the chemistry of the soul. Mind and body are but different attributes of a single substance, which, down to the smallest atom, presumably has both mental and physical properties. And it is through the ductless glands chiefly that body can affect mind and mind body. Most of the miraculous cures through suggestion, faith, and hypnotism are cures which first cause an immense and powerful change of mood. This acts appropriately upon the ductless glands, and gradually brings about far-reaching changes in the bodily organs.

Every aspect of personality, but particularly temperament, responds, on the other hand, to physical interference with these delicate chemicals in our life-blood. Insanity of the most profound kind has been known to occur from toxic causes. The poisons of disease germs, the products from digestion of alcohol, even poisons from such foods as shellfish, pork, and mushrooms, have been known to produce staggering mental transformations. A case is on record of a young man who developed confusional insanity shortly after working in a T.N.T. factory. Here the poison absorbed through the skin, and the dangerous situation setting up strain within the mind, combined to upset mental equilibrium.

We are all aware of the transformations wrought by drugs, but nature's drugs—the hormones from the ductless glands—are more powerful than any of these. One part of adrenalin in 200,000,000 parts of blood fluid suffices to produce the changes seen in an animal in fear or rage.

The great life-changes of adolescence, of the menopause and old age, with all the alteration in outlook and temperament which they occasion, are the work of the ductless glands. A German psychologist has said that in every man, after adolescence, a mild degree of mental deficiency sets in. The stimulating effect of the sex hormone causes even the most mediocre individual for a few short years during adolescence to become imaginative, alive, interested in intellectual and spiritual things. But with the withdrawal of the more powerful part of that intoxication he slips back into a humdrum, unpromising adult.

The science of the glands is still young. One hardly dares to contemplate the change in our social life which might ensue from the application of this chemical engineering to individual lives. Certainly we may come to have a very different attitude to the troublesome child, the lazy waster, and even the criminal. Berman, who, although given to enthusiastic exaggerations, has studied and practised gland therapy more than most, tells us of a typical case :

> A boy of twelve, very much alive, acute, and bright until his twelfth year. Up to this time he was easily among the first in his class and a leader in athletics. His general disposition was happy, cheerful, and imaginative. Then in his twelfth year he became lazy, fell behind in his studies, increased rapidly in weight, put on fat, and seemed to lose any imagination or initiative he had ever had. He showed a number of the stigmata of sub-thyroidism. After six months' treatment with thyroid he was restored to his former self.

If each person's temperament is expressible as a mathematical equation, involving quantities for each of the ductless glands, it is for the psychologist to solve that equation—the 'personal equation,' as Berman calls it—and to find ways of producing, where necessary, a better balanced temperament through varying the quantities of the hormones.

Alas! this talk of a precise mathematical equation is at present a visionary conception, overstepping the boundaries of established knowledge.

Our study of the physiology of types has led us far—into the shadowy realm where mind meets body. And there our intellectual lust to bring the great varieties of mentality into a simplifying framework of types must halt.

The gland types, although less defined than the surgent and desurgent types of the last chapter, and although merging into one another in a way that we do not yet entirely follow, are, nevertheless, of great importance, for they produce individuals thinking in radically different ways, incapable of understanding each other's inmost yearnings, and distinguished by gross differences in physical needs and appearance. Racial differences, of such fundamental importance in the purpose of evolution, appear, according to recent research, to be largely gland-type differences—nature's experiments with varying ingredients to arrive at the best human chemistry.

And is it our conclusion, in retrospect, that the mind is distinct from the body? Yes, as a melody is distinct from the vibrating strings or columns of air that bear it—and as inseparable. The mind and the body are but two aspects of one marvel—the mind-body.

CHAPTER XIII

APPLIED PSYCHOLOGY IN THE SCHOOL, THE FACTORY, THE POLICE COURT—AND THE HOUSES OF PARLIAMENT

ONLY a rash man would venture to predict the strange and unsuspected ways in which a new science is going to find applications in everyday life. Where a science can satisfy an old need—as, for example, the need to be cured of illness—application will rapidly outrun true knowledge, and a thousand eager middlemen will peddle their doubtful wares at every corner. But where the application requires some radical change in human thought and habit—a step upward to new powers and possibilities—it must wait upon a man with a true scientist's vision who is, at the same time, prepared to coax a sullenly conservative public opinion.

Psychology is a young experimental science, scarcely a generation old. We have already witnessed that its exaggerated application in medical psychology, where human need is great, has badly distorted—if not retarded—its scientific advance; whereas there have been obvious deductions in the social and political sphere which have passed almost unnoticed.

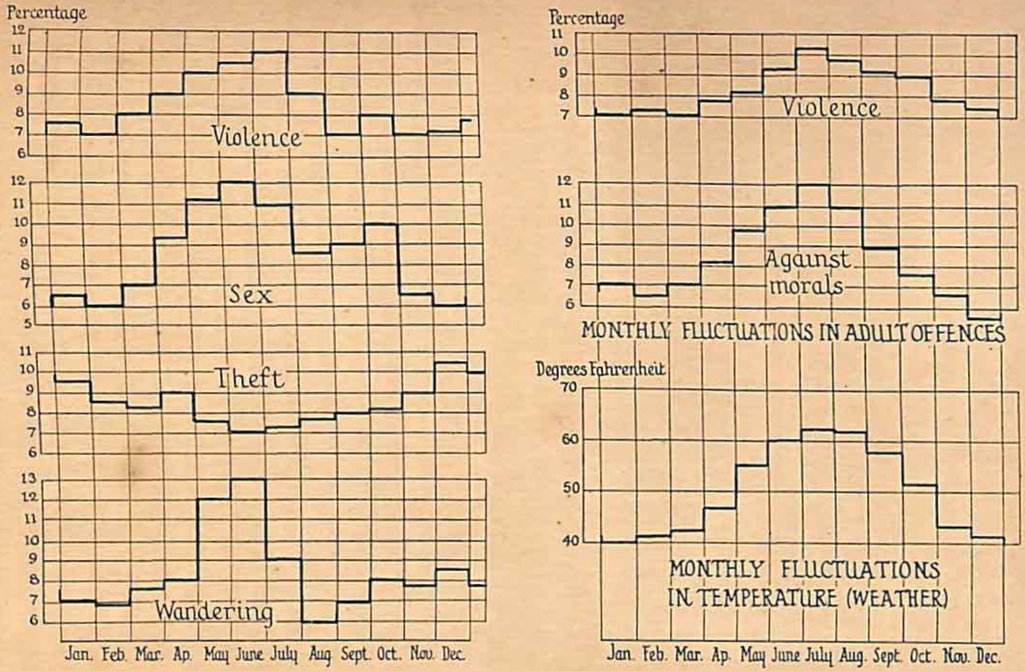
The psychologist looks at society, at traditions, laws, institutions, and ways of living, at crime and poverty, industry and education, and perceives them in a new light, as products of the reaction of mind upon mind, as understandable organic growths. And in that understanding he realizes that this Cinderella of the sciences is destined to work transformations in human life—penetrating even to the creation of ideals—which will dwarf those wrought by the older sciences.

So, in this chapter, we may glance very rapidly at what is and what might be in the way of application of psychology to such diverse social problems as education, crime, industry, and politics.

There can be no doubt that crime, like any other manifestation of the human will, is amenable to scientific laws. From Cain to Crippen and from malingering to murder there is an explainable and a modifiable psychology of crime. Indeed, the psychologist is sometimes inclined to forget that laws have been broken in his joy at finding the beautiful way in which psychological laws of personality have been fulfilled. Even the baldest statistical analysis shows, for example, that crime follows definite seasonal curves, and that the curves for some crimes differ systematically from those for others.

Probably the first person to study crime and the criminal scientifically was the Italian alienist Lombroso. By comparing a composite picture, as it were, of the inmates of State prisons with one of the outside population he concluded that there was a 'criminal type,' characterized by certain 'stigmata of degeneracy'—for Lombroso had been led to the opinion that the criminal was biologically a degenerate. He also found epilepsy, or an hereditary taint of epilepsy, to be far more common in the prison populations. He concluded: "The criminal is essentially an epileptic."

Unfortunately, later research was forced to tone down these attractive generalizations considerably. His 'stigmata of degeneracy'—a collection of physical and mental signs which included 'backless' head, cleft palate, asymmetric features, and prominent Darwinian tubercle on the



MONTHLY FLUCTUATIONS IN JUVENILE OFFENCES

MONTHLY FLUCTUATIONS IN ADULT OFFENCES

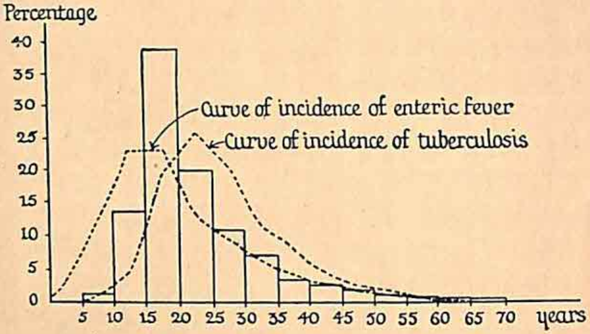
MONTHLY FLUCTUATIONS IN TEMPERATURE (WEATHER)

SEASONAL CURVES OF CRIME

After Professor Burt

ear—were found to be practically as common in the general population.

In short, the notion of a criminal type has long been given up, although it remains true that many features associated with mental defect and defective development are more common among criminals than in the general population.

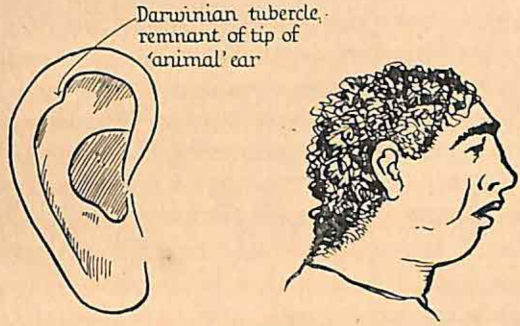


Age of First Conviction (2204 Habitual Offenders)

After Professor Burt

After this none too propitious beginning progress in criminal psychology hung fire for a generation, during which Gilbert and Sullivan expressed succinctly the current view that the "object all sublime" of magisterial wisdom was to "make the punishment fit the crime." Fortunately, through the agency of a few bold writers, the next generation grew to realize that it was more important to make the punishment fit the criminal.

Undoubtedly the original root of justice was the desire for swift satisfaction of the revengeful impulses of an outraged society. As civilization progressed this retributive motive gave way more and more to a prudent motive of deterrence—of 'encouraging the others.' This would still permit one to hang a man for stealing a sack of potatoes or deport him for snaring the squire's rabbits. Only recently has there been any thought of putting before the retributive and deterrent motives the notion of reform—according to which punishment is treatment, and may be pleasant or unpleasant depending on the needs of the case. For this change we have to thank such humane and realistic minds as that of Samuel Butler, who envisaged a society in which the sick were sent to prison (to teach them to be more careful) and the criminal sent to hospital (being beyond conscious self-help).


Darwinian tubercle, remnant of tip of 'animal' ear

'STIGMATA OF DEGENERACY'

When the social conscience had grown in the belief that society's task is not ended when it has detected and punished a crime, when people began to see that the whole cycle of making and breaking criminals is a sorry and stupid business, a demand arose for psychological advice on the question. The psychologist started by pointing out the fact, backed by careful statistics, that not one criminal in a hundred springs into existence suddenly, fully fledged, in adult life. In every case the crime has behind it a history of childhood delinquency or of abnormal mental conditions going back to childhood and beyond.

To the City of London belongs the credit of first taking the logical step—an epoch-making one, as we shall live to see—of appointing a psychologist to treat delinquency and abnormal conditions in the child while he is still at school. Cyril Burt, the son of a physician and a friend of Binet, was the intrepid pioneer who undertook to break this new ground. In a rare way he combined the sympathetic and practical clinical mind, inherited from the medical tradition of his family, with the original and far-ranging vision of the finest research scientists.

Who would imagine that this man, who quickly attacked the whole problem of delinquency with painstaking scientific thoroughness, who originated statistical and mathematical devices which excited the admiration of Spearman, and who produced monographs on abstruse psychological subjects which were models of scientific detachment and construction,[1] could be one with the person who spent eventful evenings carousing in a thieves' kitchen and whose days were taken up by avuncular chats with criminal children of the slums?

Burt realized that the psychologist, if he is to get to the heart of things, must live the lives of those whom he studies and plumb the emotional depths that human nature in its extremities strikes. Neither the raised eyebrows of the prim nor the discomforts and dangers of the situations into which he stepped succeeded in daunting his intention. And side by side with this readiness of the practical man he yet retained the exquisite detachment of the pure scientist's outlook.

His adventurous career included week-ends with bargees and stevedores, lively interviews with all manner of criminals, in gaol and out of it. On one occasion he was mistakenly locked up in a lunatic asylum, after having stayed late applying tests to the inmates.

Masterly simplicity characterized his method of investigating the causes of delinquency. He took a group of some two hundred typical delinquent children from the thousands who were referred to him. After making an intensive study of their personality, life-history, heredity, and home environment he compared the results with those for a 'control' group of some two hundred non-delinquents from homes of the same social status.

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[1] It was Burt who produced the first facts with regard to the distribution of intelligence, who showed that intelligence is largely hereditary, and who proved, to the consternation of pre-War theorists, that the intelligence of the average woman is almost exactly equal to that of the average man.

Professor Cyril Burt, the First Psychologist to the London County Council Schools

Professor Burt's study of the psychology of the young delinquent is now classical.

Photo A. E. Lane, Moseley

Firstly, he was able to reject the prevalent notion that criminal tendencies are inherited, and that there exists a type which can be called a 'moral imbecile.' Environmental causes were sufficient to account for a great number of cases. Nevertheless, low intelligence is inherited, as also is temperamental instability, both of which are most potent causes of crime. Heredity may provide a fertile soil in which moral ugliness can take root, but it is in itself not "a fatal and inexorable propulsion."

At quite an early stage in the investigation Burt was amazed by the prevalence of dullness and feeble-mindedness in these criminal children. Their average I.Q. was 89, as against 100 for the normal child. This finding was quickly confirmed in America, where Dr Healy, in Chicago, had independently set out, on lines similar to those of Dr Burt, in the pioneer investigation of the psychology of crime. There one half to one third (depending on the city) were reported to be feeble-minded or border-line feeble-minded. Healy, indeed, concluded that mental deficiency is the largest single cause of delinquency.

This is in sad contrast to the brilliant criminal of fiction and the notorious criminals of history who have captured the public imagination. Either these latter are exceptions which prove the rule, demanding a special explanation, or else the results for children do not hold for adults. Intelligence tests of adult criminals, however, quickly confirmed Burt's finding. Dr Goring, who has made a magnificently thorough study of the physical and mental attributes of the English convict, concludes :

> The one characteristic common to the offences of 90 per cent. of the 150,000 persons convicted to prison every year—the one characteristic apart from their intolerableness to a well-ordered society—is the incredible stupidity of these offences.

The reasons for this association are not far to seek. Low intelligence means that the child is unable to foresee the results of his action : the certainty of detection in the long run, the overwhelming balance of misery that will be reaped from giving way to the present impulse. There is, moreover, a second and more potent causal link : the person of low intelligence is less capable of finding interesting sublimated outlets for his libido in civilized life, and is more thrown back upon simple, animal instinctive satisfactions. These, however, are precisely the things which civilization most denies him, and he, of all people, is least able to devise ways of getting them. For the unintelligent, more than others, is liable to be trampled on, frustrated, and exploited. It was just such an unhappy boy who pulled away a chair, bearing a drawing-pin, on which his younger brother was about to sit down. His father thrashed him for pulling the chair away on which some one was about to sit. Afterwards his older brother hit him for interfering in a practical joke. To live without either violent outbursts or neurotic repressions the mental defective would require a character of more than human stability.

Rarely has this been more tragically illustrated than in a youth whom I was called upon to see one still, summer afternoon. A shaft of sunlight slanted down from the high window of his cell, revealing a dark, thickset young man, whose face could have been called handsome had it not been for the low forehead and unduly close-set eyes. From the quick, easy smile that flashed across his face one would hardly have suspected that he was awaiting trial, charged with a peculiarly brutal murder. There was no emotional abnormality, apart from a strongly rooted resentful attitude towards all authority and a distressing stammer. He proved to have a mental age of no more than eight, which placed him in the feeble-minded category. His school life had been a burden to him and to those around him. His small dark eyes flashed with anger as he recounted the maltreatment that he had suffered from various masters. His last master—a master outside the inspected realms of schools—was a burly farmer who had also bullied him, for his stupidities as a farm hand—and doubtless exploited that stupidity to his own ends. He lodged with the farmer who hired him, and never seemed to have a penny to call his own. Sometimes the farmer would jeer at him, with taunts that he could understand. And one dull, hot summer afternoon the farmer stopped to give him some instructions as he stood working between the furrows. The farmer foolishly showed the youth a dozen or more pound notes, the product of a sale at the market, and he turned on his heel to go. He was found lying across the furrows, with his head horribly battered—and the youth was down in the town, bedecked in a new suit, wearing the very latest in haberdashery.

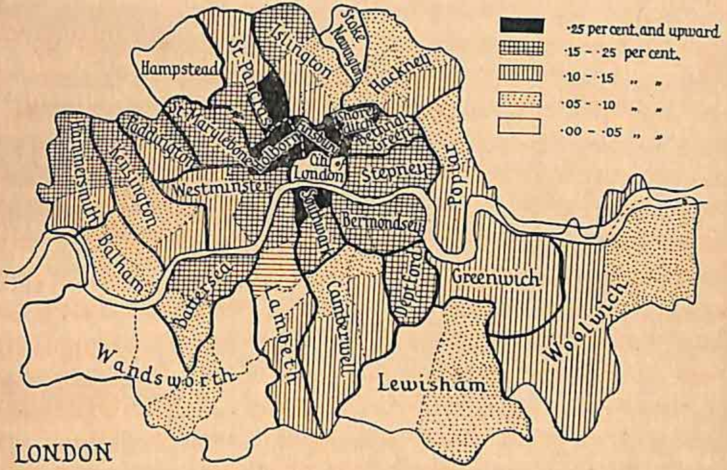
Temperamental instability, as distinct from feeble-mindedness, Burt found in 34 per cent. of this delinquent group, as contrasted with 9 per cent. of the non-delinquent. He discovered a factor of 'general emotionality'—a tendency for excessive excitability of any one instinctive emotion to be associated with excessive excitability of all the others. Describing Jerry Jones, a child with a terrible list of delinquencies to his 'credit,' he observes:

> He is desperately hot-tempered and pugnacious. . . . Many of his antics spring from sheer self-assertiveness and a love of self-display. . . . At one residential school the climax came when he climbed to the roof of the wood-shed with the chopper in his hand, and, for a quarter of an hour, terrorized all below, boys, girls, and teachers alike, threatening to 'do in' any who approached him. . . . He is apt to snatch playthings from his companions. . . . He is always hungry, and will pick up a rotten apple and munch it ravenously . . . he has shown, even at this early age [8], the instincts of sex. Yet amid all these unpleasant and aggressive traits he also exhibits, with the queerest mutability, all the gentler emotions—fear and affection, submissiveness and grief—each developed in the same exorbitant degree. On the farm he was greatly scared by the cow.

Such undue excitability of the emotions is obviously a most potent constitutional factor in a great variety of crimes—of violence, theft, sexual assault, and, indeed, of any of the unmodified instinctive reactions.

Among the environmental factors poverty was an important element. "One half of the total amount of juvenile delinquency," says Burt, "is found in homes that are poor or very poor." But even worse than poverty are extremes of wealth and poverty side by side. Most juvenile crime is found in those districts where very poor areas abut on rich ones.

Other environmental conditions[1] which showed a marked association with delinquency were: defective family relationships (60 per cent. of delinquents, 26 per cent. of non-delinquents), unsatisfactory discipline,[2] unduly harsh or weakly ineffective (61 per cent. of delinquents, 12 per cent. of non-delinquents), and the presence of bad companions (45 per cent. against 20 per cent.). All later researches are in agreement with this conclusion—that



JUVENILE CRIME RELATED TO ENVIRONMENT

Notice that the rate is highest in boroughs adjacent to the City, and where a rich abuts on a poor area. One of the blackest spots of all is East Finsbury—"a strategic point for nefarious designs," says Burt. Here, too, the birth-rate and the death-rate are practically the highest in London.

After Professor Burt (from "The Young Delinquent") the commonest and most disastrous conditions leading to delinquency centre about the family life.

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[1] It is interesting to note that the influence of the cinema is greatly exaggerated by the layman. Healy, in America, concluded that only 1 per cent. of delinquencies are motivated directly by film suggestion.

[2] It was in such a home that I once heard a parent demand, with heat, of a truant urchin, "If you wanted to go playing football why didn't you ask me?" "Because," replied the boy, sulkily, "I wanted to play football."

Continual disagreement between parents, the presence of a step-parent (the wicked stepmother of the fairy-tales is still a grim reality for many tiny children), the absence of the sobering influence of brothers and sisters—these are the conditions which are particularly prominent in the histories of delinquent children.

Finally, there is the vicious home as a direct influence (26 per cent. of delinquents, 6 per cent. of non-delinquents). Crime, brawling, bad language, open immorality, sexual aggressions on the child itself—these act not so much by suggestion (as might at first be supposed) as by setting up in the child a confusion of values, a sense of insecurity, wretchedness, and indignity, which ultimately breaks forth in some violent deed on the part of the child himself. It was such a child who explained, without comment, that he always knew when his father had gone to the races, by the fact that his money-box wouldn't rattle.

Few things are so insidiously demoralizing to the integration of child character as a restless atmosphere of conflict between parents who ought long before to have separated. Even in the formed minds of adults any upset of the world of settled values is likely to have gravely demoralizing effects on character—witness the licence that surrounds a great war, or the unprecedented immorality at times of plague, as at Athens. How much more must this hold for the groping, timid, plastic mind of the child, as yet unbuttressed by a sense of proportion?

Yet some of the greatest criminals of history have been men in whom the foregoing psychological factors have been of little importance. For example, there have been men both of high intelligence and devoid of temperamental instability. Essentially these have been the victims of neurotic obsessions or of some of the strange complexes that we have previously discussed. Burt reminds us, for example, of Benvenuto Cellini and Thomas Wainewright. The latter, well known as a poet and painter, and achieving considerable fame as a collector of rare art curios, was at one time attacked by a nervous malady, of the nature of an anxiety hysteria. Seeming to recover from this, he set out to live the life of a famous dandy. Ultimately it was established that he was the perpetrator of an amazing series of forgeries and of some peculiarly callous murders by poisoning. Among his victims was the beautiful Helen Abercrombie, his sister-in-law. When reproached with this murder, says Burt, " He shrugged his shoulders, and replied : 'Yes, it was a dreadful thing to do ; but then, her ankles were so thick.' "

Burt found a similar prevalence of neurotic conditions among child delinquents (65 per cent., as against 21 per cent. among non-delinquents). One could illustrate almost any of the major complexes which we have studied in preceding chapters from the lives of delinquent children. Space forbids illustrative examples, but one may note that perverse satisfactions for inferiority complexes exact a heavy toll from youthful happiness and virtue.

A very common unconscious process is the substitution of thieving for affection when the latter is denied. Such thefts may bear every stamp of conscious, deliberate planning for material ends—and yet the child cannot say why he stole ; nor does he make any special use of the objects taken. One recent instance met by the writer was of a boy who seemed to have solved the problem of perpetual motion, for he stole the empties from the backyard of a public-house and sold them to the innkeeper at the front. Another occurred in a girl of more than average ability who bought things for her mother in the town and sold them to her at a profit. Later she improved on this, and, taking her cue from the unjust steward, offered to pay the tradesmen's bills for her mother, returning home with forged receipts. Briefly her conflict was one due to acute resentment against, and jealousy of, her new stepfather, at whose deflection of the mother's affection from herself she bitterly repined. She was still greatly attached to her mother, but, failing to get from her the reciprocal affection that she desired, she determined (unconsciously) to get from her some tangible substitute.

From his tentative beginnings in the years before the War, Burt hewed out, in more than a decade of close and loving attention to his material, a foundation and a framework of established principles, upon which all later research-workers could successfully build. His genial smile became known to slum children of the East End, and brought confidence and self-realization to West End children too—while his scientific monographs were devoured by academic psychologists, thinking, or just sitting, in their armchairs.

Following so clear a demonstration of the overwhelming success of these methods, other cities, notably Leicester, Glasgow, and Edinburgh, appointed psychologists or set up child-guidance clinics.[1] (For even the most materially minded councillor cannot deny that it is better to spend a thousand pounds for psychological services now than ten thousand pounds[2] for the services of the police, and perhaps the hangman, a few years later.)

Burt's last task, before abdicating his unique position, to make way for a team of psychologists which a great city needed, was to work out once and for all, without any guiding precedent, the plan of the psychological clinic, which, in all big cities, must ultimately replace the isolated worker. Here he split the duties of the psychologist, calling into existence the trained psychological social worker (usually a woman), to gather data from and effect treatment in the home situation.

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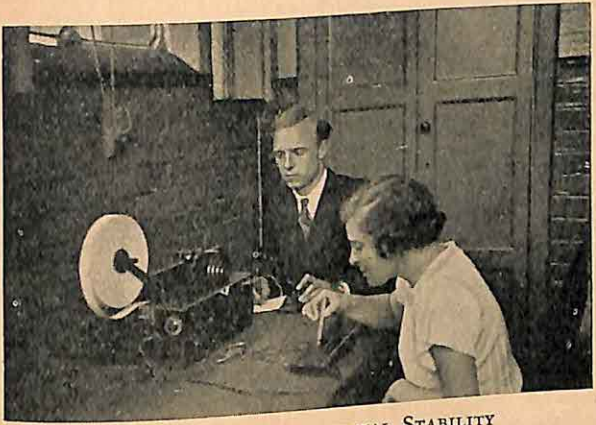
[1] Since this book was first published twelve new psychological clinics have been established in various parts of the country.

[2] Mr J. Baum, of the American Bankers' Association, estimates that in America alone crime costs roughly £1,000,000,000 each year.

The model of the clinic is thus a psychologist working with a social worker, and with a medical man to give whatever treatment is necessary on the physical side.[1]



A TEST OF TEMPERAMENTAL STABILITY

Part of the psychotherapeutic work in the Psychological Clinic, Leicester.

The whole is under the direction of a senior psychologist, who can guide both treatment and research.

What the ultimate development of the psychological, or child-guidance, clinic will be it is difficult to envisage. It has formed a firm bond with the school and the juvenile court, dealing with behaviour difficulties and nervous conditions in children. It has also begun to take over the selection and education of defectives and dull or backward children. The function of giving vocational guidance to school-leavers has been thrust upon it, since it already possesses the facts about the children and the experts capable of handling the facts relevantly. In America it has even been asked to give advice as to compatibility for marriage and as to the solution of psychological problems in marriage. It is, in short, a new institution with untold possibilities.

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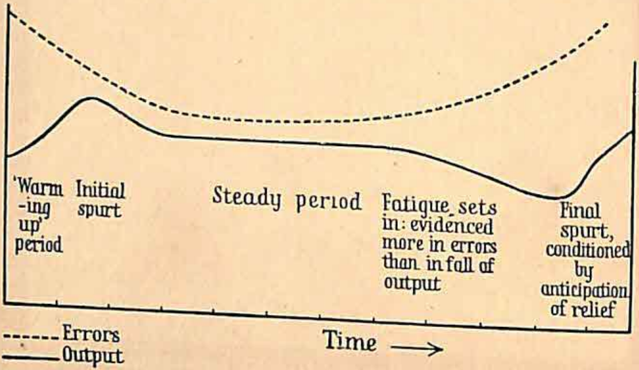
[1] The Child Guidance Clinic of America, of which copies exist in Great Britain, is based on an older conception of psychology, in which the analysis of each case is divided between a psychologist and a medical man or psychiatrist.

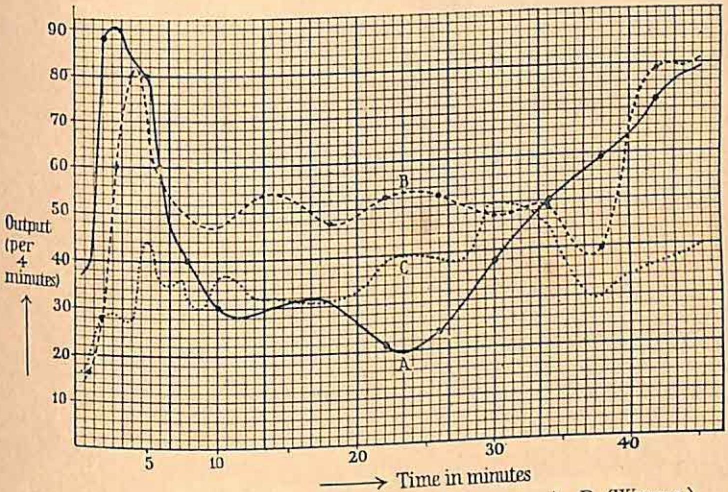
War, with all its calamities, has one virtue—that it opens the door to ideas, customs, and institutions which, in the conservative complacency of peace, might long knock in vain for admission. Thus it was in munition factories that psychological principles were given their first chance to show what the new science could do for industry. The demand for shells was ceaseless; the over-tired workers could produce no more; the limits of mechanical ingenuity had been reached. Where next could one turn? Psychologists began, therefore, by studying fatigue. They showed that there are two kinds, local fatigue and general fatigue, but that every acute local fatigue brings some degree of general fatigue.



Typical Work Curve

They found, among other interesting effects, that fatigue comes on long before the energy supplies in the bloodstream have been used up and before the exhaust products have accumulated to any considerable extent. A nervous current is set up which actually opposes and blocks the nervous impulse actuating the muscles; so that, in spite of the will, the message to continue working doesn't even get through to them. This is nature's protective device against a too despotic will.

Some kinds of boredom have the same protective function, arising when the will tries to work certain brain cells beyond the extent rendered possible by the very limited instinct energy with which they have first been invested.

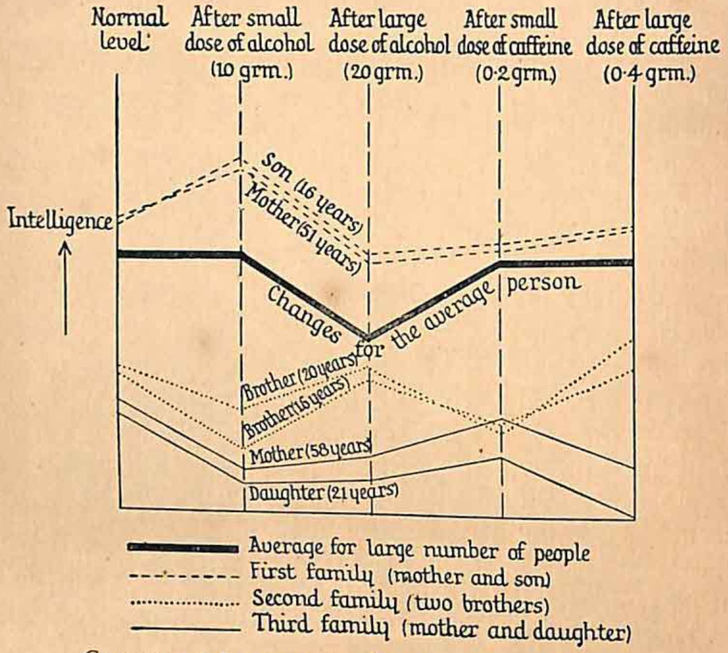


Actual Output Curves for Three People—A, B (Women), and C (Man)—for 45 Minutes' Continuous Adding

C anticipated the end too early, and grew disgusted through 'hope deferred.' *A* was an unstable, hysterical subject.

Under the demands of continuous work the human organism makes a series of adaptations and responses which follow a typical form, varying but little with the type of work concerned.

Certain drugs, notably strychnine, will offset the results of fatigue for hours, by acting on the nerve resistances—the resistances at the junctures, or synapses—which are the main root of fatigue. Alcohol, unfortunately, only removes the sensations of fatigue, and at once lessens skill, intelligence, and freedom from errors. On the other hand, in certain repressed characters it may loosen new



Changes of Intelligence (as measured by Tests) due to the Influence of Two Common Drugs

Notice how members of the same family (indicated by similar lines) react in the same way to drugs. There are obviously big individual differences in the effects of small doses of alcohol and caffeine, based on constitutional factors.

The curve for memory (ability to recall) is very similar, except that there is a positive improvement with the smaller quantity of caffeine (the stimulant in coffee).

springs of energy and favour increased output, of a crude kind. There are, however, some people in whom even intelligence improves after small doses of alcohol, although the average person shows a deterioration after larger doses, as may be seen from the above diagram.

As an immediate practical step in the factories the psychologists introduced short rest pauses. This was carried through in the face of some opposition from employers, who failed to see how shortening the hours would increase the output, and also from the employees, who, if they were to have time off, preferred to have it outside the factory.

Typical results from this kind of change are given by Dr Myers, as follows: In a bleaching factory a twenty minutes' rest after each period of eighty minutes' work resulted in a 60 per cent. increase in output (accompanied by a 50 per cent. increase in wages). In a munition factory the introduction of pauses in heavy fuse work—which reduced the working week from 58·2 to 50·6 hours—increased the hourly output by 39 per cent. and the total weekly output by 21 per cent. The effect of rest pauses often takes weeks or months to reach full fruition. Thus the introduction of ten-minute rest pauses in each spell of a ten-hour day (America) at first produced a 3 per cent. increase, which later became 17 per cent., and finally steadied at 26 per cent. The length of the rest pause has to be fixed with due regard to the nature of the fatigue and the length of the 'warming-up' period (see the diagram at p. 280).

The manner in which the interval is spent is a matter of some importance. Thus, in a laboratory experiment of two hours' continuous adding a pause of fifteen minutes in the middle produced the following improvements in output:

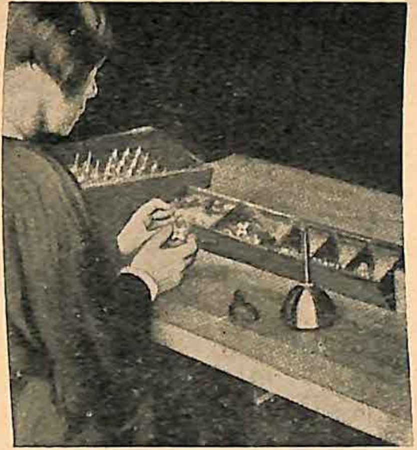
Spent in complete relaxation	9·3 per cent.
,, ,, unspecified rest	8·3 ,, ,,
Music during rest	3·7 ,, ,,
Tea ,, ,,	3·4 ,, ,,
A walk ,, ,,	1·5 ,, ,,

It is not safe, however, for untrained persons to generalize from such results, since many other factors have to be taken into account.

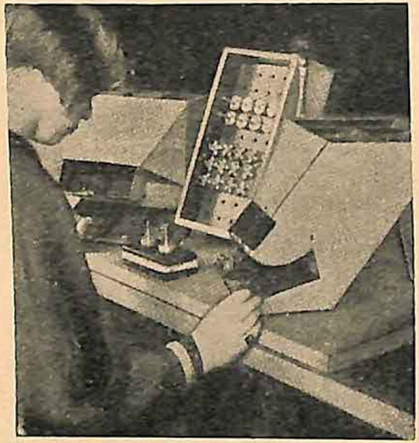
The War passed, and the applications of psychology to industry might well have passed with it, had it not been for the remarkable enterprise of a Cambridge scientist, Charles Myers. Myers was a university lecturer who had grown up hand in hand with the growth of modern psychology. To-day he might well be styled the G.O.M. of English psychology. A man with a profound mind, conversant with the widest philosophical and medical aspects of his subject, he yet turned his back on the contemplative life which he loved, and threw himself fearlessly into the great experiment of founding an institute of industrial psychology. He had a vision—who shall know how wonderful that vision was ?—of a revolution of industrial and social life through the application of the study of mind, and he gave up his quiet college rooms at Cambridge to begin the task of converting London business-men.

Good fortune threw him a coincidence at the very beginning. In the audience to which he lectured at the Royal Institution in 1918 was a business-man, an authority on the cultivation and marketing of tea and rubber, who had been thinking a good deal on his own about the terrible wastage of effort that ignorantly continues in industry, the misery that surrounds occupational misfits, and the unnecessary fatigue from unhumanized modes of work.

In the meeting of those two men in the emptying lecture-hall was born the National Institute of Industrial Psychology, in the possession of which Great Britain leads the world. All manner of industrial operations have been attacked by psychological means—from the length and weight of an agricultural labourer's hoe to the methods of training convincing salesmen—and there is hardly a big industry that has not called in the psychologist to solve some knotty problem.



BEFORE (*left*). The operator took a motor armature shaft from the tray, holding it with the left hand. The right hand then assembled a tension spring and an oiled felt washer. After assembling and adjusting nut and lock nut the unit was placed in the tray. The left hand was nothing more than a holding fixture. Following this, it was necessary to adjust the tension and set it by means of two small end wrenches.



AFTER (*right*). A foot-operated holding fixture holds two shafts, and duplicate trays hold the parts. A prepositioned screwdriver with a special socket is used to screw the nut to a definite location, eliminating 50 per cent. of the testing operation. Treating felt washers with oil eliminated the oil-can. Each hand simultaneously removes a shaft from the tray and places it in the fixture. Then both hands assemble the tension spring, oiled felt washer, armature, another oiled felt washer, adjusting nut, and lock nut. The right hand secures the screwdriver and returns it to holder after use. Both hands then remove the assemblies from fixture and place them in the tray. Old time, 1.11 minutes; new time, 0.32 minutes; saving, 71 per cent.

A CHANGE IN AN INDUSTRIAL PROCESS—MOTOR ARMATURE SHAFT ASSEMBLY—RESULTING FROM A CLOSER STUDY OF THE MOVEMENTS AND MENTAL PROCESSES OF THE WORKER

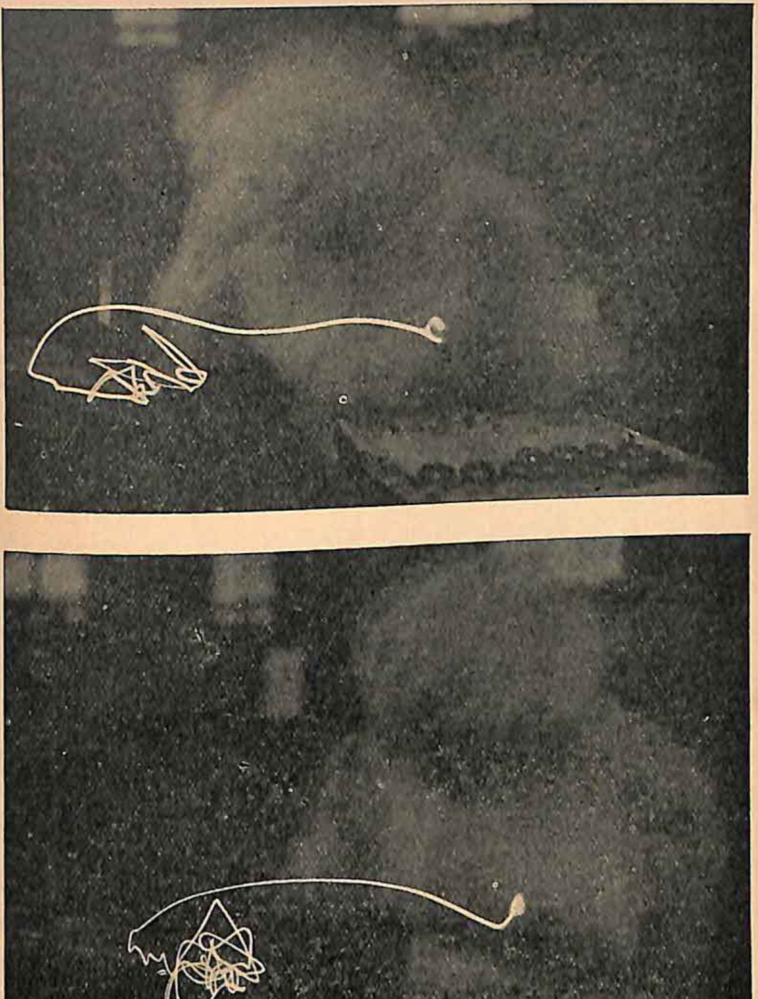
Great improvements have been brought about even in such simple matters as the design and the lay-out of tools, adapting them to anatomical and psychological principles, but in this field, as may be imagined, tradition is a powerful obstacle.

Repetitive processes (packing, stamping, drilling), which are so important as to have become the very prototype of modern industry, have come in for intensive investigation by the method of motion study. A small electric lamp, flashing intermittently, is fastened to the workman's hand, and his rapid, skilled movements are photographed from two angles. From the photographs, which represent a sinuous trail of light, a wire model is constructed. The speed of various movements is indicated on the photographs by the lengths of interrupted flashes.

By comparing the models of good and bad workmen it is possible to pick out faulty movements and arrive at the principles behind the most economical work. The introduction of a rhythm and of simultaneous movement with both hands are points generally observed to be of advantage.

One recent investigation, of considerable interest to all in a hectic modern world, has centred on the effects of music and of noise. To discuss the psychology of music, even from so narrow a standpoint, would take us too far afield—there are so many different types of listener. For the poet Romain Roland music was "a moony light to eyes wearied of the harsh glare of this world's sun." For an apparently similar type, the essayist Lamb, it must have been something very different, for he tells us of his efforts to listen to music "till, for sheer pain, and inexplicable anguish, I have rushed out into the noisiest places of the crowded streets."

Generally speaking, slight increases of energy, some postponement of fatigue, and appreciable but not startling rises in output, have accompanied the use of music in

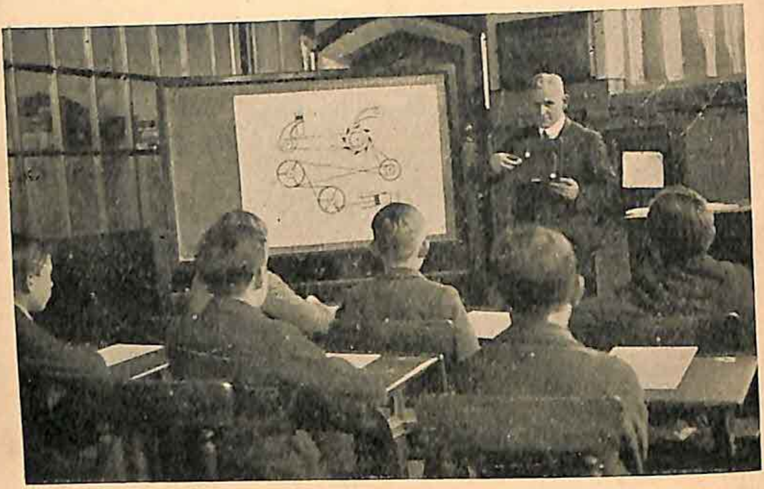


Motion-study Photographs, made as described in the Text

Above, the best worker in the chocolate-covering department. *Below*, a worker of many years' experience making many unnecessary movements.

workshops—a use which the musician may yet condemn as a prostitution of melody.

Strangely enough, the effect of excessive noise, over any measurable period, has generally been a slight improvement (5 to 10 per cent.) of output; except, of course, where the noise prevents perception of necessary sounds.



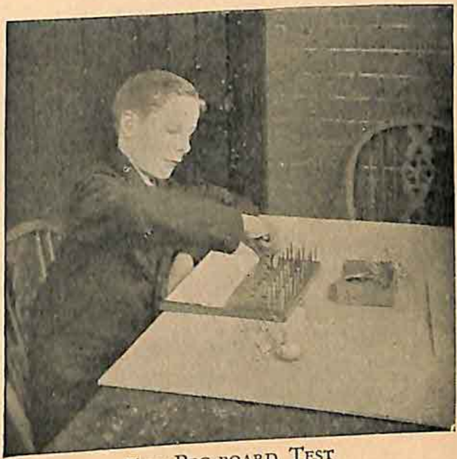
A TEST OF MECHANICAL APTITUDE

This test forms part of the vocational-guidance testing given to school-leavers in Leicester schools.

But we get the rest of the story when the energy output is measured by the oxygen-consumption method. Then we find that the energy expenditure during work under such conditions is nearly half as much again as it would be if quiet prevailed. This is the appalling cost of noise.

One branch of industrial psychology—vocational guidance, the elimination of the tragedy of the square peg in the round hole—has met with a most gratifying degree of success. By some minds the occupational misfit, like a wet day, is taken for granted, as an unalterable feature of this "best of all possible worlds," to interfere with which would amount to an act of irreverence. It remains true, however, as Spearman pointed out at the conclusion of his study of *g* and the special *s*'*s*, that every one could be a genius at something.

The first experiment in vocational guidance was carried out in London during the years 1923-25. In addition to a measurement of intelligence, measurements are made of such special abilities as mechanical aptitude, mathematical ability, skill in drawing, verbal ability, manual dexterity, etc. Not all of these are unitary factors or immune from the effects of training. Manual dexterity, moreover, is a thing in which any given group of children will rank differently according to the type of dexterity measured. In any given dexterity, however, it is possible to predict with some accuracy the rank which any given child will have after further training shall have been given, as in the course of factory training, and the same applies to most of the trainable aptitudes.



THE PEG-BOARD TEST

This is a test of manual dexterity in use in a Leicester school, for purposes of vocational guidance.

Of equal importance for a happy adjustment to one's job is the assessment of temperament and character differences. What human spectacle can be more harrowing than that of a surgent, sociable type doomed to spend his days in an isolated machine job; or a man of enterprise and independence in a soulless routine task ; or, conversely, a timid, placid man, who would love a repetitive job, pitchforked into a hurly-burly of forceful personalities ? There are people who would prefer to earn a living by putting the dots on dice, and others who would be happier 'earning' a living by throwing the dice.

To complete this psychological cross-section of a personality, therefore, combined estimates and measurements are made of such temperament and character traits as we have discussed, including, of course, a measure of the perseverative index.

When all is ready the results for each child are usually arranged in the form of a 'profile.'

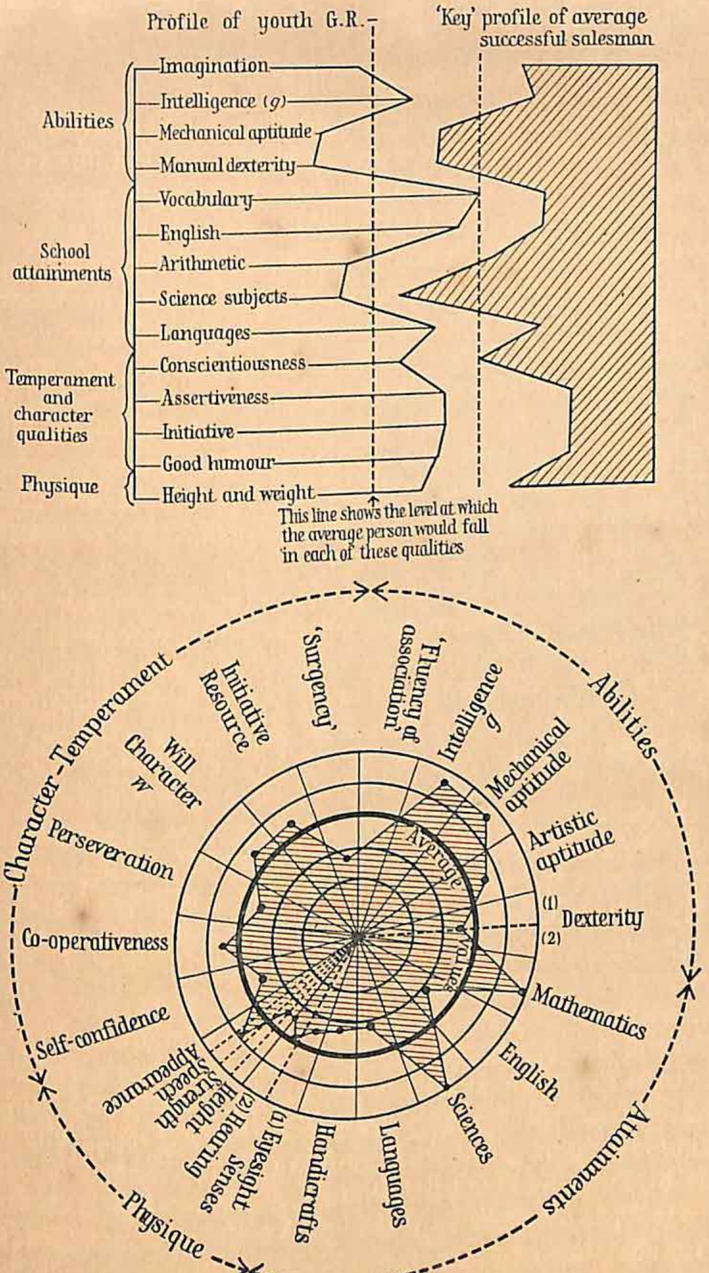
Here is the key, but where is the occupational lock that it should open ? That is where 'occupation study' becomes necessary. The psychologist, usually by comparison of the qualities of successful with those of unsuccessful workers, endeavours to find what particular qualities are vital to each occupation.

Owing to the immense variety of occupations and so-called occupations, the task of providing a full index of 'occupational profiles'—wards for the individual key—is a staggering one. Neither can we expect to find a perfect fit, since no civilized occupations—with the possible exception of beer-tasting—were created with special regard to the inclinations and capacities of human beings.

With regard to intelligence itself, fairly complete surveys now exist. Some examples from an occupational intelligence index are given at p. 293.

In any case, the adjustment of profile to profile is not the simple mechanical task of fitting key to lock—for a personality is more than a sum of qualities. This is a delicate adjustment, demanding the services of an experienced artist in vocational guidance.

Judged by its fruits, in human success and happiness,



PROFILES OF ABILITIES AND OCCUPATIONAL REQUIREMENTS

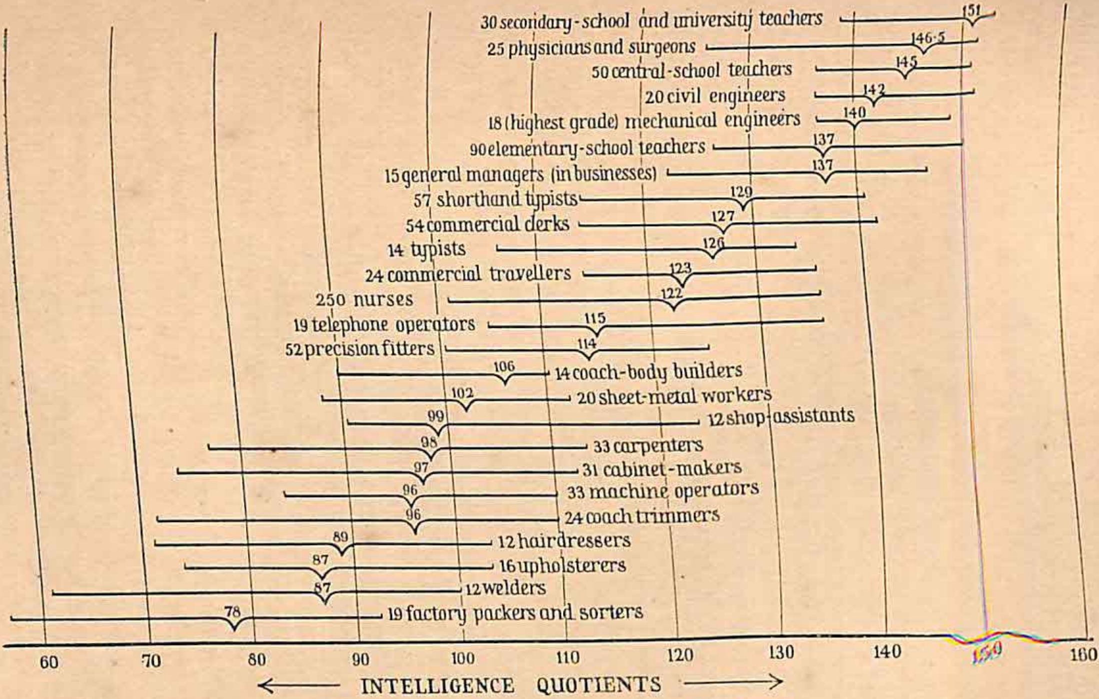
Above, profile of a particular individual. Length of horizontal lines represents degree in which each capacity is possessed. On the right is the (inverted) profile for a successful salesman, with which the individual's profile makes a pretty good fit. *Below*, new style of profile, embodying the latest temperament and character tests, in use at Leicester. The profile is that of a boy with promise as a civil engineer.

this innovation is a definite achievement in progressive social organization. If we compare, for example, the percentage of successes among those who took posts in accordance with psychological advice with the percentage for those who chose non-accordance posts we find (London experiment) that 83 per cent. of the former found the work congenial and the pay and prospects good, whereas only 2 per cent. found the work distasteful. In the non-accordance posts, on the other hand, 39 per cent. reported the work congenial, while 42 per cent. found the work distasteful and unsatisfactory. The verdict of the employers was even more emphatically in favour of workmen and candidates chosen by psychological in preference to interview methods.

Thus has the vision of a psychologist, dreamed in the quiet backwaters of Cambridge, become a beneficent reality in thousands of lives. It will doubtless grow in usefulness in proportion to the amount of money which the country spends on research into technical problems of pure psychology.

Of all fields of application, that concerned with education and child-management has been the recipient of the greatest bounty from the psychologists. And that is only scientific justice, for it was under the wing of the educationist that psychology was fostered in its earliest years.

One of the most discouraging features of the world of education is that it consists of highly intelligent, keen, idealistic people, seeing, with finer vision than is given to the man in the street, the importance of education in life and leisure, yet warring fractiously among themselves, reasoning upon insufficient premises, swept from side to side by fads and fashions, or stranded on the sterile rocks of conservative tradition. From this the new science of mind offers rescue and purposeful direction.



INTELLIGENCE LEVELS IN VARIOUS OCCUPATIONS

The central figure on each line indicates the average I.Q. for the sample taken. The length of the line subtends the scatter of I.Q. of the middle 50 per cent. in that occupation.

Here we can but glance at a few of the changes and contributions made. The complex subject of character-education—always a preoccupation of English schools—is still full of uncertainties, but the experience of the psychological clinics with abnormal and delinquent children has led to considerable changes. These have been generally in the direction of much greater freedom for the child and towards guidance through reasoning. In unintelligent hands this means nothing but spoiling, but to the intelligent teacher it means the end of repressed and distorted characters, who, like Saul Kane in *The Everlasting Mercy*, may, if left to themselves, some day throw off those repressions violently, or else continue, spiteful and timid, till the end of their days. Above all, it means the preservation of initiative in the child, together with such direct control of the springs of interest as to double the amount of school output obtained from the child.

Corporal punishment, which has persisted because it is so much easier for a lazy (and larger) adult to apply a stick than to attempt to understand the child and reason with him, receives but little encouragement from the educational psychologist. Let us glance at laboratory experiments with rats. If a rat is being taught, by punishment with an electric shock, to learn to run a maze or master some other problem, it is found that there is an increase in the speed of learning with each increase in the severity of the shock—up to a certain point. Beyond that strength of shock the rat gets confused or unduly excited, and learns less rather than more quickly. The 'optimum' strength of shock is found to vary for different tasks. For very simple problems the optimum may be a moderately strong shock, but as the adjustments required become more and more elaborate the optimum effect is obtained by a very moderate shock indeed. Whence we may reasonably conclude that it is at any rate wiser to thrash a child for bullying than for being bad at arithmetic. Among students too it has been statistically shown that methods of praise and commendation are more effective than censure, ridicule, threats, and punishment.

An unexpected result of these scientific applications is that they have changed the goals as well as the methods of education. In years gone by (we hope) many a poor boy was drilled for years in Greek and Latin (who would never use these languages in later work or leisure) because it was thought to 'train his mind' for other things. A considerable 'transfer of training' from one field to another was always confidently prophesied, and, indeed, 'known to exist.' Experimental psychology gives an emphatic 'no' to this claim. Even where the two tasks are very similar the transfer is slight. Thus, one experimenter trained a large group of boys in sorting out, according to size, a stream of ball-bearings centring on a half-inch diameter. They made considerable improvement, but when they were transferred to sorting out ball-bearings centring on a quarter-inch diameter they did no better than their own pre-training attempts.

As we have seen in Chapter II, there may be good grounds for selecting persons (equally trained in Latin) for the civil service administrative posts according to their success in a Latin examination, but that is because the latter correlates well with intelligence. Even so an intelligence test would be better.

Again, the finding that intelligence is wholly inborn (not necessarily wholly inherited) has called a halt to the fruitless strivings after the vain educational goal of 'developing intelligence.' Education may aim to make each child use extensively the intelligence that he has, but it cannot expand that intelligence. At the same time the realization of the wide range or scatter of I.Q.'s has led to the creation of various types of education adjusted to various minds—

more abstract and academic for the high I.Q.'s, more concrete and practical for the more numerous moderate I.Q.'s.

Some light has been thrown upon the vexed question of examinations. The public attitude, as represented by the perennial outbursts in the Press, seems to be that examinations are totally false and misleading, but that we must not on any account give them up. In the first place, the psychologist has substituted intelligence tests for examinations, wherever, as in scholarship examinations, native ability has to be picked out. For the intelligence test points forward, to what the candidate can do in the future; whereas attainment in examinations merely looks backward, and may be vitiated by interrupted education, past illness, unsuitable teachers, and all manner of accidental circumstances.

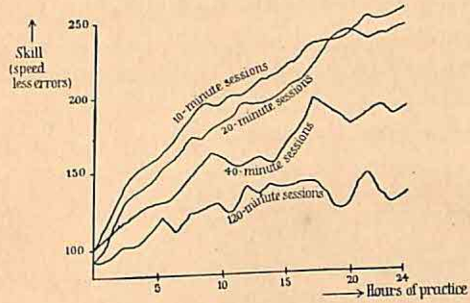
Wherever the after-careers have been followed up, as at Columbia University, in New York, it has been found that the predictions from intelligence tests have been uncannily accurate, and far truer than those from examinations—*e.g.*, from the New York matriculation examination.

On the other hand, where it is desired to plumb the depths of the candidates' ignorance the psychologist produces a new type of examination. Here the aim is to test information or skill and leave intelligence out of account. Briefly the scheme consists in presenting a large number of short, point-blank questions, the answers to which are either 'yes' or 'no.'

Such an arrangement picks holes in a candidate's smoke-screen and his shock troops of humbug, just as a machine-gun will cause more casualties than a couple of blunderbusses. But educational advance lags behind scientific warfare because there are some controlling minds in education who would make the mentality of the War Office appear a marvel of enlightenment and progress.

Perhaps the most potent reproach against the old type of examination is that the candidate's fate depended too much upon the examiner's idiosyncrasies—and what he happened to have had for lunch.

One of the early workers in improving the psychology of examinations took an essay at random and sent it round (with particulars) for a score of teachers to mark. It received all manner of marks from 10 to 90 out of a 100.



Relation between Length of Sitting and Economy in Learning

The curves are for forty-two students learning to decode a new system of symbols. Notice that in the long run there is hardly anything to distinguish between the two shortest periods.

After Dr Starch

Yet the essay type of examination is dying hard, because teachers do not take fondly to testing their pupils by methods differing entirely from those by which they themselves have been coached. Indeed, some do not take kindly to examinations at all, because they insist that there are desirable spiritual qualities which cannot be measured. To this, Thorndike, the American psychologist, rightly replies, "Everything that exists exists in some amount," and it is only a matter of time before it can be measured—although it may be another matter to evaluate it.

Since all education, from the crudest mechanical learning to the apprehension of the highest spiritual truths, depends upon the functioning of memory, it is not surprising that the greatest attention in educational psychology has been given to discovering how memory works and how it can be improved.

A number of principles of practical value have been discovered, as, for instance, that if one has a certain amount of time to give to studying a subject it is more profitable to divide up that time into shorter periods—to 'space' the learning—than to use it in one lump (see diagram at p. 297). On the other hand, 'whole' learning is better than 'part' learning—*i.e.*, if one has to learn a long poem it is better to read the whole through each time than to bite off small pieces and read them over and over until learned. (Yet most people are naturally inclined to do the latter.)

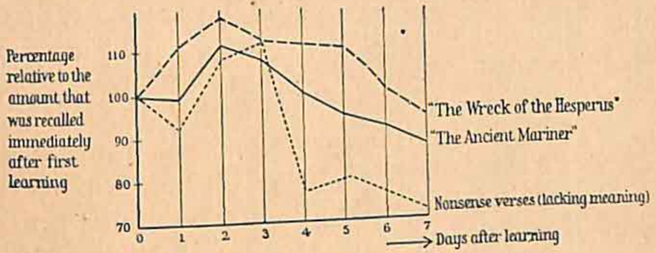
WHOLE AND PART LEARNING

NO. OF LINES LEARNED	TIME	
	Part Method	*Whole Method*
20	16 minutes	14 minutes
60	81 ,,	64 ,,
240	431 ,,	348 ,,

Throughout the early work one fact became increasingly clear: that the old likening of memory to a treasure chest, into which one drops objects to remain until wanted, is very misleading. Ballard, a London inspector, carried out memory tests with children which showed that less could be recalled immediately after learning than after the lapse of a whole day.

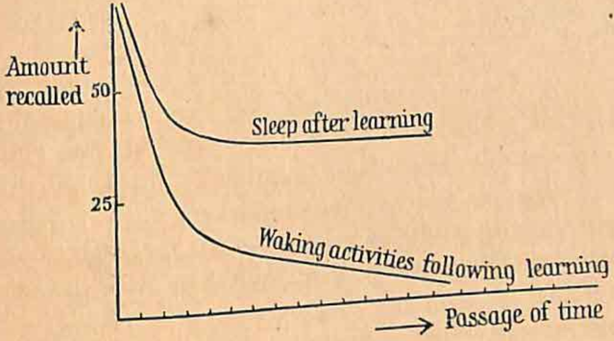
Most people have had the experience of being unable to recall a piece of music immediately on leaving the theatre, only to produce the complete tune a day or two later. Memory goes on working, setting its house in order, after we have consciously finished with it. Hence the truth in the saying that we learn to swim in winter and to skate in summer.

Again, if a person undertakes strenuous mental work immediately after committing a number of things to memory it is found that the memory is impaired. Evidently a certain amount of mental energy is detailed off to consolidate memories, and its recall for other purposes prevents that consolidation.



A CURIOSITY OF THE LAW OF FORGETTING

Dr Ballard's results (for children) show that we remember *more* with lapse of time, for two or three days; then obliviscence sets in. This effect is equally marked for meaningful and meaningless material, but is felt far less by adults than by children.

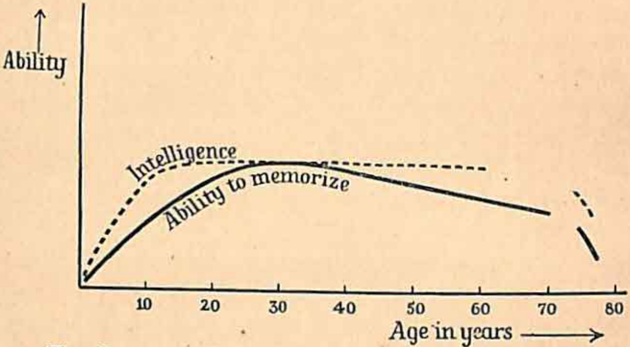


THE CLAIMS OF MEMORY ON MENTAL ENERGY

The upper curve shows the amount remembered when the subjects have gone to bed immediately after committing to memory, the lower when other work has followed the work of memorizing. Energy is still being drafted to the 'consolidation' of memories after we have consciously finished 'committing to memory.'

After Jenkins and Dallenbach

Forgetting is not so much a matter of decay as of interference, suppression, and withdrawal of interest. Thus has experiment at length joined hands with the Freudian observation of repression. The same 'aliveness' of stored memory has been brought out in a striking fashion by Professor Bartlett, of Cambridge, who retailed a story to a student. The student then told it to a second student (writing down his version as he did so), who, after a lapse of time, told it to a third student, and so on. The record of the changes which the story underwent is both instructive and amusing. Definite laws were discovered, which may even throw some light on the miracles performed by village gossip. The following is one of Bartlett's stories at its fifth, eleventh, and fifteenth reproductions :



THE RISE AND DECLINE OF ABILITY TO MEMORIZE

Individuals differ, but, on an average, power of memorizing goes on improving until the age of about thirty is reached. (It is not greatest in infancy, as is popularly supposed, probably on account of deficiency of ideas with which to form associations.) Thereafter it slowly declines, until senility sets in. Intelligence, on the other hand, reaches its fullest powers earlier, and, as far as is yet known, suffers but little decline with age. (The curve at this point is partly speculative.) The German psychologist Möbius was wont to say that "after the twenty-fifth year there occurs in the average man a slight onset of permanent idiocy"; but this referred to emotional freshness in using intelligence, not to intelligence itself.

Fifth Reproduction

The Indian drafts of 1918 were, on the whole, rather poor. One man was found to be suffering from acute ophthalmia, which had been self-inflicted, and another from mental deficiency, which last case was cured by physical friction. The case, however, which caused most embarrassment to the authorities, since it interfered with discipline, and, in particular, was a source of continual annoyance to the sergeant-major, was one of stone-deafness. The man was sent back to the dressing-station, but, unfortunately, with a label attached to his back giving the number of his battalion. He was sent back, and again returned, this time with two labels. Some days afterwards the adjutant saw from the opening of the mess tent an excited group of Indians approaching, among whom was the case of deafness, who, regardless of discipline, was shouting, " Speak, speak : I hear."

Eleventh Reproduction

The quality of the drafts of Indians sent over in 1918 was poor. The first suffered from a severe form of ophthalmia, which was self-inflicted. The second had a curious mental disease. The third was dumb, which was both annoying to his sergeant-major and subversive of military discipline. One day the adjutant met him outside his tent shouting with others, " I speak, I speak ; I hear, I hear."

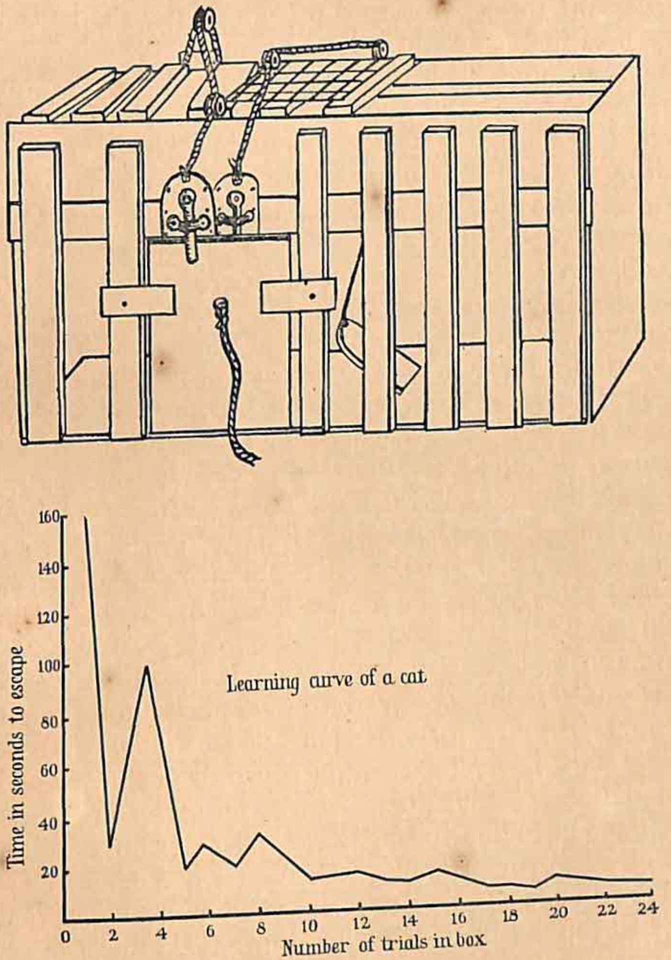
Fifteenth Reproduction

The Indian quota of 1918 was very poor stuff. The first lot had some peculiar form of ophthalmia, the second lot were deaf, and the third were dumb. The sergeant-major thought this very prejudicial to discipline. He was walking along the ranks one day with an officer, who was surprised to hear the exclamations, "I hear, I hear: I speak, I speak."

Memory, as mentioned in Chapter I, where we discussed brain localization, is broadly of two kinds : true memory (for incidents, principles, etc.) and mechanical memory (motor habits, such as swimming, skating, or singing *God Save the King*). Bergson, it will be remembered, regarded the former as a spiritual power and the latter as a matter of physical brain only.

The two forms differ in many ways beside their relative degree of brain localization. Mechanical memories are acquired gradually, and when acquired are never lost. Mechanical memory is more unconscious: we can dress, ride a bicycle, typewrite, say our prayers (as children), while thinking of other things. Only if some hitch occurs—as if the collar-stud is missing when we are dressing—does the process become conscious. Similarly habit memory often comes into action without willed intervention, and follows automatically through a chain of actions, each of which sets off the next in sequence. This was brought home in an amusing fashion to a friend of the writer who used sometimes to hire for an afternoon's ride a donkey that was used on a milk round in the mornings. If this friend was so unfortunate as to strike unwittingly on some part of the morning's itinerary he was unable to get back to his intended course until the donkey had duly completed the milk round.

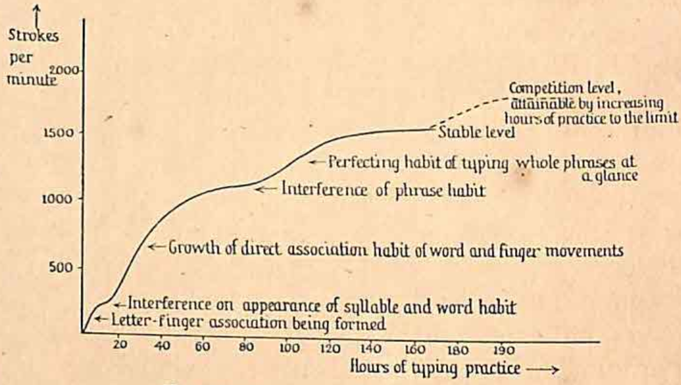
In mechanical memory it has been discovered that there are frequently distinct 'plateaux' in the learning curve. These are periods in the learning of such skills as typewriting and telegraphing, during which the learner appears to mark time for hours, days, or weeks. At one time they were thought to be due simply to 'staleness,' but it is now realized that every complex habit is really a hierarchy of smaller habits, and that these apparently unfruitful periods are 'incubation' times following on the perfection of one constituent habit and preceding the rise of another. Thus they tend to occur in typewriting when a letter-finger habit is established and while a word habit is rising, and again in the transition from word habit to phrase habit. At such times typing performance may even show, temporarily, a decline.



The Building up of Mechanical Memory

Professor Thorndike put cats and dogs into a puzzle-box such as that represented above. They showed no insight into the simple mechanisms required to release themselves, but hit upon the right way by accident, just as a human being does in swimming, riding a bicycle, or skating. The curve shows how such skills are gradually acquired according to a learning curve which falls rapidly at first, and then more slowly.

These are but glimpses of the scattered beginnings of a great change in education. What increase of 'efficiency' psychology has wrought—if the term 'efficiency' can be used in speaking of such a complex and spiritual process as that of education—no one can assess. But through more efficient methods of learning, better methods of selection and testing, and the knowledge of where we can and where we cannot fruitfully apply effort, the total saving of time and effort of teacher and taught must have been great. Particularly valuable have been the clarification of aims, the sifting of fact from humbug, and the establishment of firm spots in the morass of speculation, upon which we can build. The application of psychology to education is, nevertheless, only just beginning, and the greatest rewards will not be reaped until there is more psychology to apply.



Plateaux in the Learning Curve

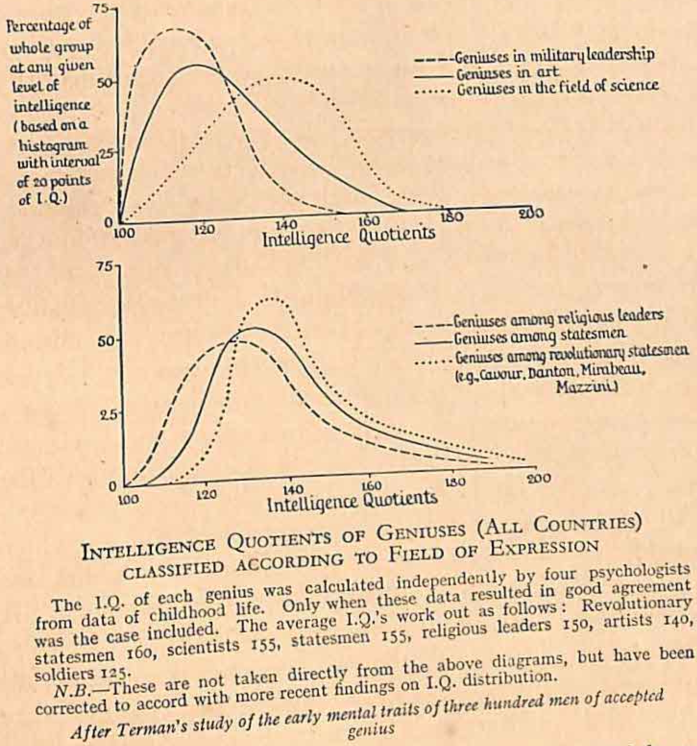
This shows the positions at which plateaux most commonly occur in typing skill under conditions of intensive learning. These have been variously attributed to 'staleness,' excessive effort wrongly applied, habit interference, and the difficulty of eliminating unsuitable habits. Most probably the plateaux in typing are due to habit interference (linking up simpler habits into more complex ones) as indicated in the diagram.

Those who have watched closely the influence of applied psychology in the school, the factory, the clinic, and the courts are convinced that it holds in store greater and more pervasive changes than those just described. Already it points to unprecedented steps in politico-social organization. Already it breathes a change into the modes and habits of individual and social thought.

If, for example, we realize that intelligence is largely inherited; if we see at the same time that the maintenance of a high level of culture, of economic prosperity and political stability, depends not so much upon political ideas as upon the presence of a sufficient percentage of high-level inborn mental capacity in the population; then we shall perceive the urgent necessity of a periodical census of intelligence and of reversing the present decline by discouraging the high birth-rate among low I.Q.'s and increasing it among high I.Q.'s. Since we realize also that criminal and stupidly anti-social action arises with far greater frequency among the 25 per cent. of the population with I.Q.'s below 90, we appreciate that the same procedure would also decrease considerably a nuisance which, to the politician or magistrate, seems quite unrelated to the problem of economic or cultural elevation. Thus we come to put new values on hitherto unsuspected root causes, and to regard as trivialities some matters which Governments now pursue with a sense of immense importance.

In my book *Psychology and Social Progress* I have sketched the applications of psychology to the more urgent social, political, and ethical problems of our generation, but the present book—the story of psychology as such—must halt upon the threshold of these vaster issues.

Although the psychologist finds himself on the side of the hereditarians with regard to mental defect, he is not so with regard to most neurotic and insane conditions. In the first place, most of these could be avoided by wise education or early psychoanalysis, and, in the second place, With this influence there is bound to go a change in social thought; a realization that scientific thinking must be applied to man; a reaching out to a detached experimental standpoint in regard to human affairs; a realization



Intelligence Quotients of Geniuses (All Countries) classified according to Field of Expression

The I.Q. of each genius was calculated independently by four psychologists from data of childhood life. Only when these data resulted in good agreement was the case included. The average I.Q.'s work out as follows: Revolutionary statesmen 160, scientists 155, statesmen 155, religious leaders 150, artists 140, soldiers 125.

N.B.—These are not taken directly from the above diagrams, but have been corrected to accord with more recent findings on I.Q. distribution.

After Terman's study of the early mental traits of three hundred men of accepted genius

of the immense biological adventure upon which each community is embarked, and a vivid interest in the scientific reports and dispatches which show how the great leviathan, of which each one of us is a part, breathes and grows and evolves new powers.

Here too, for the first time, a science may have an immense humanizing influence—because it is the science it would be unwise to breed out of the population whatever predisposition there is to abnormality, for such instability has immense value. Mania, melancholia, and schizoid derangements, in their milder forms and when associated with high intelligence, produce those imaginatively plastic or superhumanly penetrating intellects which have given us the finest fruits of genius and jerked the stolid majority from an old rut into a better one.

Ever since democracy was born there have been persistent attempts to free it from the defects which sometimes threaten it with extinction. Bernard Shaw has demanded that politicians should pass some test of mental fitness; while politicians, for their part, have long protested that they might cease to be demagogues if the most suggestible and irresponsible section of the electorate could be eliminated. There is no doubt that the psychologist could devise tests, which could be applied during the course of vocational guidance at school-leaving, to indicate those who, in a newspaper-ridden community, might safely be given the vote.

An acquaintance with the emotional mechanisms which alter intellectual views would doubtless help politicians themselves to realize in what fields their judgments are likely to be good and where they are likely to be false and perverse. Even intelligence level has its effect. An American psychologist who compiled lists of I.Q.'s of English politicians from a close study of records of their childhood behaviour found, when he divided them into radical and conservative groups, that the former had a decidedly higher I.Q. average.

Yet it is not in any specific social application that the greatest change will lie. We have seen how the psychological clinic, for example, tends slowly to spread its functions, responding to new opportunities and demands, into a widening circle of life.

of humanity. When individuals are more enlightened as to their own psychology we may confidently look to a dissolution of the harsher, cruder, and more obstructive features of society. Consider, for example, public opinion. There is no doubt that from the vantage-point of hidden gossip, back-biting, and 'moral indignation' people give expression to sadistic impulses which neither they nor society would countenance elsewhere or undisguised. To be psychologically instructed is at once to have a finer sense of moral ugliness and to be able to alleviate psychological tensions by tracking them to their source and by attaching the suppressed drives to more social and pleasant goals.

Consider, too, how, if every one were naturally instructed concerning the emotional origins of illusions, the most bitter conflicts of opinion might be settled; while some of the greatest bugbears in the path of social progress would vanish into thin air. A recent investigation into the origins of group opinion studied, among other things, the strongly expressed attitude of a certain sect of people opposing a certain innovation. The private opinions of each member were also, in confidence, elicited. The staggering outcome was that not a single member in private held the view which the group held in public. Each was afraid of what the others would think, or cautious, lest he should be ignorant of some fact upon which, he imagined, the others might be basing their opinions.

While on the question of awareness of motive one might ask how many adults have stopped to think that their belief in the efficacy of certain ways of bringing up children may be based, not on any sound, demonstrable principles, but on the fact that those methods are most consonant with adult convenience, adult dignity, and the individual's naive love of power.

What damage these mechanical, unpsychological ways of handling human problems have done to whole generations! To produce inhibitions with respect to a few undesirable manifestations of the sex instinct the Victorians knew no better than to damn the whole instinct, bind it with disgust, and so produce thousands of neurotics, tens of thousands of unhappy marriages, and millions of vindictive, fear-infested women and men.

To go farther would be to invite error, for this novel science is but a small lamp, dimly burning, by which people strive to glimpse the corners of a large room. Some day, when they realize that further social and cultural growth depends on the slow, laborious growth of a small nucleus of pure psychology, people will demand more research—they will give the lamp some oil.

INDEX

Adaptability to new situations, 52
Addison's disease, 242
Adjustment of education to intelligence, 296
Adler, Alfred, 159, 163–166
Admiration, ingredients of, 175
Adrenal gland, 244–245, 252; types, 245
Air-raid, an, psychogalvanic record of, 260
Alcohol, and temperament, 224; and mental output, 282
Ambivalent attitudes, 153
American army experiment, 80–81
Analogies test, 60–61
Ants, mechanical instinct in, 95
Anxiety neurosis, 196
Applied psychology, 266
Aristotle, 17, 219
Auto-erotic libido attachment, 150
Autonomic nervous system, 255–256

Ballard, P. B., 298
Bartlett, F. C., 300
Bavarians, 236
Beavers, 94
Bechterev, von, —, 32
Bees, 95
Beethoven, Ludwig van, 161
Behaviourism, 116
Bentham, Jeremy, 84
Bergson, Henri, 22, 28
Binet, Alfred, 43, 80
Binet scale, 44–46
Birds, 94
Blood chemistry and temperament, 241
Body build and temperament, 235
Borneo head-hunters, 105
Brain, 17–39; localization, 23, 24, 34, 37; direct stimulation of, 25–26; operations on rats, 27; weight and intelligence, 28; evolution of, 29
Brainless dog, 33
Breathing records and emotion, 261
Breuer, Joseph, 121, 124
Brilliant children, 84
Broca, Dr, 20
Burt, Cyril, 46, 270–280

Cæsar, Julius, 235
Cannon, Professor, 252
Capacity to acquire capacity, 53
Cattell, McKeen, 42
Censor, the, 131
Charcot, Jean-Martin, 120, 122
Chicago, 26
Classification test, 59
Co-conscious mind, 215
Colour vision, 23
Compensation for organ inferiority, 160
Completion test, 57–58
Complexes, 123
Compulsions, 119–200
Conative experience, 257
Condensation, in dreams, etc., 132, 138
Conditioned reflex, 111, 173; in infants, 114; compared with sentiment, 178
Conflict, 123–124; and dreams, 134–136
Connecting fibres in the brain, 36
Conscience, 189-193
Contempt, 175
Correlation coefficient, 54
Cretinism, 75, 242
Crime, 266–278; and temperamental instability, 274; and environment, 276
Cyclic insanity, 221, 234
Cyclothyme temperament, 235

Darwin, Charles Robert, 79, 93
Delinquent children, psychology of, 271–278

Delusions, 201, 209
Dementia præcox, 155, 198, 225
Demosthenes, 160
Descartes, René, 46, 93
Destiny and the unconscious, 154
Devine, —, 209
Displacement, in dreams, 132, 138
Dr Jekyll and Mr Hyde, 214
Don Juan and the Œdipus complex, 155
Dramatization, 132, 137–138
Drawing ability, 56
Dream work, 132
Dreams, 130–141; as wish fulfilments, 131; analysis of, 137, 157; duration of, 140; and external stimuli, 140
Dual personality, 214–217

EDUCATIONAL psychology, 292, 304
Eduction of relations, 69–70
Ego, the, 129, 186
Ego instincts, 172, 187–188
Einstein, Albert, 69
Electric potentials and the brain, 38
Ellis, Havelock, 148
Emotion, and the brain, 30–31; and reflex action, 116; bodily changes during, 250–253, 259, 261
Endocrine-gland interaction, 246, 263
English character, the, 236
Epilepsy and crime, 266
Examinations, psychological investigation of, 297
Extravert and introvert, 221 *et seq.*

FABRE, JEAN-HENRI, 94–96
Fatigue in industry, 280–284
Fear instinct, 98–99, 116, 134
Feeble-mindedness, 71–72, 73; definition of, 71–72
Feeling and derived emotions, 174–176
Fluency of association and surgency, 231
Forgetting, 123, 128; of embarrassing ideas, 129
Free association, 124
Freud, Sigmund, 118–129, 130–134, 141–147, 148–157, 170, 180, 211
Friends and enemies, temperaments of, 239
Fundaments in thought processes, 68–70

g and *s*, 54
Galileo, 192
Gall, Franz, 17–18, 20
General emotionality, 274
General intelligence, 42
Genius, 40, 160–162; and instability, 86, 194, 306
Gesell, Arnold, 61–63
God, conception of, 71, 211
Goethe, J. W. von, 79, 84, 213
Goltz, —, 33
Guilt sense, 199

HALLUCINATIONS, delusions, and illusions, differences between, 201
Hamlet, 154
Hatred, 174
Head, Dr, 33
Healy, Dr, 271–272
Herd instinct and mental gifts, 100, 102, 179–180, 183, 184
Hippocrates, 219
Hobbes, Thomas, 141
Homosexuality, 165
Humboldt, Alexander, 236
Hypnotism, 120, 122, 180–181
Hysteria, 118–119, 122, 196, 222

IDIOTS, 71, 72; definition of, 71
Illusions, experimental and in life, 201–206
Imbeciles, 71, 72–73; definition of, 71
Individual differences, 42
Inference tests, 59–60
Inferiority, sense, 159; complex, 162
Inheritance of intelligence, 83
Insects and instinct, 94, 106
Instinct, in animals, 96, 98; in man and mammals, 97–99, 100, 172; modification of, 101–103, 173
Instinct energy, 106, 117, 167
Intelligence, definition of, 52–53, 67; tests, group and individual, 57–66, 80–81; quotient, 77–80; growth of, 81–82; distribution of, 87–88; and occupation, 90–91; and social status, 91; and crime, 272
Introvert and extravert, 221 *et seq.*
Itard, J.-M.-G., 43

JACKSON, HUGHLINGS, 30–31
Jaensch, W., 246
James, William, 250
James-Lange theory, 250
Janet, P., 120
Jeanne d'Arc, 201
Jung, Carl, 157, 221, 231–232
Justice, psychological motives behind, 269

KÖHLER, W., 49, 50
Kretschmer, E., 235

LANKES, —, 225–226
Lashley, F. K., 26–28, 34, 37, 38
Latent content in dreams, 132
Laughter, psychological theories of, 142
Leadership and perseveration index, 238
Libido, 148, 150, 163, 171
Locke, John, 237
Loeb, J., 106, 107
Lombroso, Cesare, 194, 266
Love, structure of sentiment of, 183-184
Luther, Martin, 189
Lying, detection of, 261

McDOUGALL, WILLIAM, 97, 99, 105, 118, 146, 171, 172, 180, 195, 213
McDougall's drainage theory, 111
Mania, 212, 225
Manic-depressive insanity, 212
Manifest content in dreams, 132
Masculine protest, 164
Mathematical ability, 55
Mechanical aptitude, 288
Mechanistic viewpoint, 106–107
Melancholia, 198–200
Memory, 22, 25, 297–302; mechanical and true, 22, 28, 301
Mental age, 45
Mental defect, 71–76
Microcephalic idiot, 75
Mill, John Stuart, 40, 84
Mind and body, 262, 264
Mongolian imbecile, 75–76
Moral imbecile, 271
Moths and flame, 107
Müller, Johannes, 19
Music, psychological effects of, 286
Musical ability, 56
Myers, Charles, 283, 284
Myths, origin of, 151

NEURASTHENIA, 222
Neurine, 35
Neuroses, 118–129, 277
Neurosis as a solution of conflict, 162, 166
Newton, Sir Isaac, 69
Nietzsche, Friedrich Wilhelm, 163, 194
Noise and energy wastage, 288
Normal curve of distribution, 87

OBSESSIONS, 119, 122–123, 200
Occupational levels of intelligence, 293
Œdipus complex, 151–153
Over-compensation, 161

PARANOIA, 207
Parathyroid deficiency, 246
Pascal, Blaise, 79
Patriotism, roots of, 181
Pavlov, I. P., 111, 113
Performance tests of intelligence, 61–66
Perseveration, 224, 231; measurement of, 225–228; and faulty character, 233–234
Persistence of motive, 185
Personality profiles, 291
Phrenology, 18
Piéron, H., 23–24
Pinard, —, 226, 232
Pituitary-gland types, 246
Plateaux in learning curves, 302
Plato, 17, 46, 139
Pleasure principle and reality principle, 150
Politicians, intelligence of, 306, 307
Poverty and crime, 274–275
Precocity of genius, 78
Primitive passive sympathy, 180
Psychoanalytic movement, the, 169–170
Psychogalvanic reflex, 258–259
Psychological clinics, 278
Psychological types, 219–240
Psychology, development of, as a science, 265; and social progress, 305
Punishment in schools, 294–295

Quickness and intelligence, 56

Racial unconscious, 158
Reflex action, 108
Reflex-nerve connexions, 110
Reflexology, 116
Regression, 150, 155–156
Relationships, perception of, 68–69
Repression and suppression, 123, 166–167; and moral laws, 166
Rest pauses and industrial output, 283
Reverence as a derived emotion, 176
Rivers, W. H. R., 33, 122
Robespierre, Maximilien, 161–162
Rousseau, Jean-Jacques, 207

s and *g*, 54
St Anthony, hallucinations of, 202
" Savage of Aveyron," 43
Schizoid insanity, 221, 235
Schizothyme temperament, 235
School progress and intelligence, 86
Schumann, Robert, 202
Scorn, 175
Seguin, Édouard, 43
Self-assertive instinct, 100, 102, 134, 138, 175
Self-regarding sentiment, 185
Self-submissive instinct, 174
Sensation, 33–34; and brain localization, 20–25
Sentiment, structure of, 177; and character, 187; and complex contrasted, 187
Sentiments, origin of, 174
Sex, instinct of (mating), 98; and repression, 133; in infancy, 148; glands and temperament, 245
Sexual frigidity in women, 165
Shakespeare, 235
Shaw, George Bernard, 306
'Shell-shock,' 194
Size-weight illusion, 204
Slips of memory and intention, 125–126
Slugs, predictable behaviour of, 108
Socrates, 46
Spandrell (in *Point Counter Point*), 154
Spearman, C., 46–47, 48, 53, 55, 67, 92
Spencer, Herbert, 141
Stephenson, W., 226, 228
'Stigmata of degeneracy,' 268
Stoddart, W. H. B., 198, 199, 212, 213, 227
Sublimation, 101–103, 125; and perversion of instinct, 168
Suggestion, 180
Super ego, the, 193
Surgent and desurgent temperament, 228–229, 232
Symbolization, 132, 133, 138, 210
Synapse resistance and temperament, 229, 232
Synapses, 112

Temperament, classical doctrine of, 219–220; modern notions of, 229–233; and race, 235, 238 *n.*; and the endocrine glands, 244-247
Terman, Lewis M., 49, 71-78, 80-81
Thorndike, E. L., 47
Thymus-gland types, 245
Thyroid-gland types, 243
Tropisms, 106–109
" Two-factor theory," 54–56

Unconscious mind, 123, 129, 131; its lack of discrimination, 128
Unifocal theory of intelligence, 53

Vegetative nervous system, 255–256
Visual perception and the brain, 37
Vocational guidance, 288–292
Voltaire, 84

War neuroses, 134
Wasps, instinct in, 94, 96
Watson, J. B., 114–115, 116
Wells, H. G., 70
Will, 185, 187
Wish-fulfilment mechanism, 124, 131
Wit, 141; repressed tendencies and, 143–144
Witnesses' evidence, 204
Wittels, F., 152
Word-blindness, 24
Word-deafness, 24
Wundt, Wilhelm, 42